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14 JUL 2003

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Hazardous Waste Permits Program
Hazardous Waste Bureau
New Mexico Environment Department
2905 E. Rodeo Park Dr, Bldg E
Santa Fe, New Mexico 87505-6303

Subject: Comments on Class 2 and Class 3 Permit Modification Requests

Dear Mr. Zappe:

The purpose of this letter is to submit comments responses on the Class 2 modification request package submitted to your office on May 12, 2003, which included the following items:

1. Packaging-Specific Drum Age Criteria for New Approved Waste Containers
2. Removal of Booster Fans
3. LANL Sealed Sources Waste Streams Headspace Gas Sampling and Analysis Requirements
4. Add New Hazardous Waste Numbers
5. Remove Formaldehyde as a Required Analytical Parameter for LANL

Also included are comments on a Class 3 modification request entitled:

Construction and Use of Hazardous Waste Disposal Units

The comments are the result of pre-submittal meetings in Santa Fe; public meetings held in both Carlsbad and Santa Fe, and written comments from the Environmental Evaluation Group, New Mexico Attorney General's Office, Southwest Research Information Center (SRIC) and Nuclear Watch New Mexico (NWNM). In addition, we have reviewed the content of the form letters provided by SRIC and NWNM to the public for submittal to the agency. It is our belief that these letters proposed no technical objections that require further clarifications.

In some cases we have provided language that modifies, clarifies or supplements the modification requests. In those cases we have marked the comment response in bold. Comment responses that are not bolded provide clarification to the PMR.

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If you have any questions regarding this submittal, please contact Mr. Jody Plum at (505) 234-7462.

Sincerely,

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U. S. Department of Energy

Steven D. Warren, General Manager
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RESPONSE TO PUBLIC COMMENTS

Packaging Specific Drum Age Criteria for New Approved Containers

Comment 1: The previous drum age criteria (DAC) modification followed the Class 3 procedures and by the same logic the present modification should be regarded as a Class 3.

Response: The previous modification included a change to the conceptual and numerical model for calculating the DAC. Since a revised model and formulas were being employed it was considered a significant change and was subjected to the Class 3 process. The NMED reviewed and approved this model during the Class 3 process which included public comment and public participation during the Class 3 hearing and specifically incorporated this model in the HWFP as the appropriate methodology for future DAC value calculations. The same model is used in this permit modification request (PMR) as was approved by the NMED. Because the DOE is using the identical method to what is incorporated into the HWFP the DOE has concluded that this modification should be classified as a change to the existing waste analysis plan which is a Class 2 modification.

Comment 2: The DAC provisions are now so complex that only a hearing will suffice to explain them.

Response: As indicated above the complexity of the DAC revolves around the model which was thoroughly validated in the previous Class 3 modification. This PMR uses

this model in the way the HWFP intended to allow the evaluation of additional packaging configurations . This is accomplished by changing some packaging specific input variables without affecting the validity of the model or associated formulas as established during the Class 3 process.

Comment 3: It is stated that the DAC for 85 gallon drums, 100 gallon drums, and ten drum overpacks (TDOPs) have been developed using the same methodology as was used in developing DAC for 55 gallon drums, which were adopted by order dated December 31, 2002. However, the process of developing drum age criteria is not necessarily a simple formula.

Response: The permit modification is not proposing the development of a drum age criteria process. This process was established through the Class 3 permit modification process on December 31, 2002. This PMR applies the developed and approved process to an additional set of packaging configurations. The process or model used to calculate the packaging-specific DAC values proposed by this PMR for 85- and 100-gallon drums and TDOPs uses the same formulas used to calculate the currently permitted DAC values (i.e., the same governing equations, VOC physical properties, etc.). The model is designed to be used with variable inputs for specific packaging configuration parameters. The application of this model and associated formulas to the new containers (85- and 100-gallon drums and TDOPs) requires only the use of different input parameters associated with different packaging configurations.

Comment 4: Attachment C outlines various assumptions made in deriving DAC values, and the validity of such assumptions requires examination. For example, assumptions as to the presence, number, and diffusivity of filters in the newly added containers must be supported.

Response: The documentation requirements approved during the Class 3 process for 55-gallon drums and standard waste boxes (SWB) also apply to the new containers for use of DAC values. For example, the existing Permit (Attachment M1, Section M1-1b) requires each 85-gallon drum, 100-gallon drum, and TDOP to be filtered. In order for the generator to use the new DAC values, the containers are required to be filtered with filters complying with the tables in the PMR. Filter specifications are controlled through site procurement and quality assurance protocols. In accordance with procedures or purchasing specifications, sites must determine compliance with the minimum specifications for filter vents. Under a site's quality assurance program, the use of filter vents that meet the specifications is documented in an auditable record. The Permit requires that the diffusivity be reported for each filter used (Module IV, Section IV.D.2.b).

Comment 5: Moreover, it will need to be shown whether there is any change necessary in the modeling used, based upon scale effects.

Response: The DAC model uses chemical transport mechanisms to describe the transport of VOCs across each confinement layer within a given waste packaging configuration (permeation across a polymer barrier [i.e., a plastic bag], diffusion through a filter

vent, diffusion in air, etc.). The transport of VOCs is primarily limited by the resistance associated with the confinement layers, such as plastic bag(s) and/or filter vent(s). The model incorporates effective resistances for VOC transport across a plastic bag and across a filter vent that are approximately two or more orders of magnitude greater than VOC transport within a void volume. Therefore, no scaling adjustments are needed in the DAC calculations for the 85- and 100-gallon drums and TDOPs.

Comment 6: NMED previously examined the development of DAC for 55-gallon drums with the assistance of expert consultants. A similar process should be followed here, and the consultants should be made available to testify at hearings on this proposal.

Response: The DAC model and associated formulas previously examined and approved by NMED are the basis for this PMR. As required by the Permit (Attachment B1, Section B1-1a(3)), the same methodology used to calculate the DAC values approved by the Class 3 modification was used to calculate the proposed packaging-specific DAC values for 85- and 100-gallon drums and TDOPs. Only the input parameters to the model differ based on the requirements for the new container types and packaging configurations.

Comment 7: There is an ambiguity in proposed Table B1-8. The footnote says that in the event of inability to determine packaging configuration group, a 55-, 85-, or 100-gallon

drum will be assigned by default to Group 3. However, Group 3 is captioned as applicable only to 55-gallon drums.

Response: Footnote "a" of Table B1-8 should be retained and, for clarification, it is suggested that the referenced caption in Table B1-8 should be revised as follows: "Packaging Configuration Group 3, 55-gal. drums, 85-gal. drums, and 100-gal. drums [a]."

Comment 8: Scenario 3 packaging configuration groups are defined with reference to layers of confinement. (See Table B1-8). However, it is not clear from the proposal how the term "layer of confinement" is applied with respect to waste drums that have been treated by compacting.

Response: Packaging Configuration Group 7 may be used for a 100-gallon drum that contains a compacted 55-gallon drum (as referenced by the proposed text in Sections B1-1a(1) and B1-1a(2)). Regardless of its contents, a 100-gallon drum may only be assigned to Packaging Configuration Group 7 if compliance with the packaging configuration specified by Table B1-8 (i.e., no inner bags, no liner bags) is demonstrated and documented by the site. In accordance with the requirement in Section B1-1a(3), the Headspace Gas Sampling Batch Data Report must include all supporting information used to determine the DAC, including packaging configuration. As stated in Sections B1-1a(1) and B1-1a(2) and footnote "a" of Table B1-8, if a specific Packaging Configuration Group cannot be determined, a default Packaging Configuration Group of 3 for 100-gallon drums must be assigned.

Comment 9: Certain assumptions have been adopted in developing DAC for 85-gallon, 100-gallon, and TDOP containers. (See Att. C at 1.). Factual support should be offered to support the validity of such assumptions. For example, what is the basis in fact for assuming that the inner bags and liner bags used in packaging a TDOP are the same as used in a Standard Waste Box (at 1)?

Response: Definitions for "liner bag" and "inner bag" are included in Table B1-8. These definitions provide specifications for liner bags and inner bags that are the same for standard waste boxes (SWB) and TDOPs. As such, the use of inner bags and liner bags in TDOPs that are the same as those used in an SWB is a requirement rather than an assumption. Because the Table B1-8 Packaging Configuration Groups are specified in terms of these bag definitions, bag types that vary significantly from these cannot currently be used to satisfy the packaging specific requirements for DAC values. The footnote on Table B1-8 should be revised to read as follows: "Definitions: Liner Bags– One or more optional plastic bags that are used to control radiological contamination. Liner bags for drums have a thickness of approximately 11 mils. Liner bags are typically similar in size to the container. SWB liner bags have a thickness of approximately 14 mils. TDOPs use SWB liner bags."

Comment 10: What is the basis for assuming that compacted 55-gallon drums with rigid liners placed inside a 100-gallon drum have met the appropriate 55-gallon DAC value before compacting (at 2)?

Response: Compacted 55-gallon drums with rigid liners placed inside a 100-gallon drum are required (not assumed) to have met the appropriate 55-gallon drum DAC value. As stated in the PMR in Sections B1-1a(1) and B1-1a(2), "if a 100-gallon drum (i.e., Packaging Configuration Group 7) contains a compacted 55-gallon drum containing a rigid liner, **the 55-gallon drum must meet the appropriate 55-gallon drum DAC** [emphasis added] to ensure that VOC solubility associated with the presence of the 55-gallon rigid drum liner does not impact the DAC value for the 100-gallon drum."

Comment 11: What is the basis for assuming that TDOP packaging configuration parameter values are the same as for a SWB?

Response: The use of the SWB packaging configuration parameter values for the TDOP is conservative due to the normal packaging of bulk items directly in the TDOP and much larger actual filter diffusivity values than assumed in the model inputs. As stated in Attachment C of the PMR (page 2), the difference in the total hydrogen diffusivity values between the TDOP and the SWB filters results in the calculation of shorter DAC values for the TDOP. The longer SWB DAC values bound the DAC values for the modeled TDOP packaging configurations and have been selected for use. As such, Tables B1-9 and B1-10 specify the same DAC values for TDOPs and SWBs.

Comment 12: What is the basis for assuming that headspace void volumes of 85- and 100-gallon drums are 20% of the volume outside of packaging (at A-5)?

Response: The 20% void volume estimation for 85- and 100-gallon drums is consistent with current site plans for these containers, including AMWTF current plans for the efficient loading of 100-gallon drums (i.e., three to five compacted 55-gallon drums per 100-gallon drum). In addition, changes in the void volume in these containers have minimal impact on the calculated DAC values because the transport of VOCs is primarily limited by the resistance associated with the confinement layers, such as plastic bag(s) and/or filter vent(s). The model incorporates effective resistances for VOC transport across a plastic bag and across a filter vent that are approximately two or more orders of magnitude greater than VOC transport within a void volume.

Comment 13: In the proposal, 85-gallon drums and 100-gallon drums come exclusively within Packaging Configuration Group 7, a group that allows no inner bags or liner bags. It appears to be assumed that such drums will not contain such bags. It should be clarified whether this means that no bags of any size are permitted to be placed within such containers, or, on the contrary, such bags are not counted as confinement layers if they do not enclose substantially all the waste contents.

Response: An 85- or 100-gallon drum may be assigned to Packaging Configuration Group 7 only if the site demonstrates that the specified packaging configuration consisting of no layers of confinement (i.e., no inner bags, no liner bags) is met. The 85- and 100-gallon drums assigned to Packaging Configuration Group 7 are not allowed to have

bags of any size as confinement layers. It should be clarified that the term "bag" refers to a confinement layer. A confinement layer is a boundary that encloses the waste. For example, punctured bags, open-ended bags, and pieces of plastic sheeting wrapped around the waste for handling are not considered as confinement layers.

Comment 14: The current modification now introduces the concept of a filter in the inner lid of 85-gallon or 100-gallon drums. Permittees should establish the bases for assuming that such filters have the range of diffusivity values stated (Att. C, at 3, Table 1).

Response: The acceptable filter diffusivities are specified by the TRUPACT-II Safety Analysis Report. The filters specified in Attachment C, Table 1 are within the range of acceptable diffusivity values established by the TRUPACT-II Safety Analysis Report. Module IV, Section IV.D.2.b of the Permit requires that the sites report the filter diffusivity. When the site is determining the DAC value for an 85- or 100-gallon drum with headspace samples taken between inner and outer drum lids, the diffusivity of filters on the inner and outer drum lids cannot be less than the lowest number in Tables B1-9 and B1-10.

Comment 15: Further, it should be shown how the diffusivity value of the inner lid filter can be identified after the drum is closed.

Response: Under a site's quality assurance program, the use of items, including filters, that meet specifications must be documented in an auditable record (e.g., purchasing specifications or procurement records for filter vents). Typically, a site will have

documented the filter characteristics for determining compliance with specifications prior to its use. As specified by Footnote "a" of Tables B1-9 and B1-10, if the diffusivity for a filter in a container is undocumented or unknown, a filter of known diffusivity must be installed prior to initiation of the relevant DAC period.

Comment 16: The model apparently simulates the diffusivity of an inner liner filter by adjusting the values assigned to the inner liner. (at A-5). Such a modeling approach needs to be fully explained.

Response: The gas diffusion characteristic (or release rate) across an opening is defined in terms of the gas diffusivity, cross-sectional area, and diffusion path length. Therefore, if an inner confinement layer has a filter vent, the DAC model (VDRUM) can represent this confinement layer as a drum rigid liner lid with an opening provided that the cross-sectional area is selected such that the gas diffusion characteristic across the drum liner lid opening equals the filter vent gas diffusion characteristic. This simulation of the inner lid filter vent is simply for convenience and is an accurate representation (i.e., the simulation provides the same release rate as that of the actual inner lid filter vent).

Comment 17: Further, is it invariably correct to set the release rate of the outer layer of confinement to the diffusivity of the inner liner filter (at A-6)?

Response: When the DAC model (VDRUM) is used to calculate the DAC for a drum in which the headspace gas sample is taken inside the filtered inner drum lid prior to placement of the outer drum lid, the outermost layer of confinement is the inner

lid with a filter vent. The input file to VDRUM is set up so that the release rate across the outermost layer of confinement equals the release rate, or hydrogen diffusion characteristic, across the inner lid filter vent. The other layers are described as ultra-thin walled layers of confinement that effectively describe waste with no additional layers of confinement (i.e., no inner or liner bags), which is consistent with the packaging configuration specified in Table B1-8 as Packaging Configuration Group 7.

Comment 18: Direct-loaded 85-gallon drums are not currently acceptable for transportation in TRUPACT-IIs, according to Revision 19b of the *TRUPACT-II Authorized Methods for Payload Control* (TRAMPAC; April, 2002; see Section 2.1.1 for currently allowed payload configurations). Perhaps equally important, the TRUPACT-II *Certificate of Compliance* (Certificate 9218, Revision 15; April 9, 2003) states (p. 2):

Materials must be packaged in one of the following payload containers: a 55-gallon drum, a 100-gallon drum, a standard waste box (SWB), a standard pipe overpack, an S100 pipe overpack, an S200 pipe overpack, or ten-drum overpack (TDOP).

Note that 85-gallon drums are not one of the available payload containers. The NMED might want to inquire as to progress toward gaining the Nuclear Regulatory Commission's (NRC) acceptance of the 85-gallon containers for direct-loading purposes, and inclusion of 85-gallon drums

into the TRUPACT-II *Certificate of Compliance.*

Response: Agree with comment. The application for Revision 20 of the TRUPACT-II Authorized Methods for Payload Control (TRAMPAC) (currently under preparation for submittal to the U.S. Nuclear Regulatory Commission [NRC]) includes the 85-gallon drum as an authorized payload container for TRUPACT-II transport. The direct load configuration of the 85-gallon drum can be shipped only after approval by the NRC.

Comment 19: The Advanced Mixed Waste Treatment Facility (AMWTF), a WIPP waste generator, plans to compact waste in 55-gallon drums and place these "pucks" in 100-gallon drums to ship to WIPP. The PMR proposed text change contains the following statement (p. B-2):

If a 100-gallon drum (i.e. Packaging Configuration Group 7) contains a compacted 55-gallon drum containing a rigid liner, the 55-gallon drum must meet the appropriate 55-gallon drum DAC listed in Table B1-6, B1-7 or B1-10 to ensure that [Volatile Organic Compound] VOC solubility associated with the presence of the 55-gallon rigid drum liner does not impact the DAC for the 100-gallon drum.

When the 100-gallon drum is the container being sampled for headspace gas the sorption of the liner would also potentially affect the gas dispersal from other compacted 55-gallon drums packaged in the 100-gallon drum, and there would be

a potential need for a correction factor to the 100-gallon drum DAC, not just that of the 55-gallon drum in its pre-compacted state. This might be the case, for example, if the VOCs in the 55-gallon drum with the liner do not saturate the liner, but that drum is on top of the other compacted drums in the 100-gallon container that have VOC-emitting materials in them, in which case the liner could potentially absorb these VOCs until saturation is reached. The NMED may want to establish whether or not such a possibility would affect achieving steady-state equilibrium prior to approving this PMR.

Response: The case in which "VOCs in the 55-gallon drum with the liner do not saturate the liner" will not exist if a sufficient VOC source term is present because compliance with the DAC is imposed as a requirement for the 55-gallon drum prior to compaction (i.e., if the 55-gallon drum has met the DAC, the rigid liner is saturated). In the event that 55-gallon drums of different total VOC concentrations are placed together in a 100-gallon drum, VOC desorption from the rigid liners of the high VOC concentration drums may occur concurrent with VOC absorption from the rigid liners of the low VOC concentration drums. In this situation, VOCs would simultaneously be released from and absorbed by liner material. Unlike in a new drum with a rigid liner, VOCs are being released from the liner material into the drum headspace as well as being absorbed. The presence of liner material amidst the compacted 55-gallon drums does not impact the steady-state conditions in the 100-gallon drum.

Comment 20: A second consideration is that compaction of 55-gallon drums may change the diffusion characteristics within the container. Pathways to the exterior of a crushed 55-gallon drum from the VOC-emitting materials may be much more restricted than the pathways in a loosely-packed drum, and the number of pathways will be limited by the surrounding steel from the crushed 55-gallon drum. The NMED may want some demonstration that the DAC for 100-gallon drums containing compacted 55-gallon drums has also been analyzed for this possibility.

Response: The compacted 55-gallon drum puck is considered as part of the waste and a constant VOC source term for this waste is assumed in the calculation of the 100-gallon drum DAC values.

Comment 21: A third issue is that the DAC table referenced in the statement quoted above, Table B1-10, Scenario 3 Drum Age Criteria (In Days) Matrix for S3000 and S4000 Waste by Packaging Configuration Group, does not include debris wastes. The major intent of this PMR is to establish DAC values for debris waste to be compacted, not S3000 and S4000 waste, because S3000 and S4000 wastes are not likely to compact appreciably. The AMWTF apparently has no plans to compact them. Table B1-9, Scenario 3 Drum Age Criteria (In Days) Matrix for S5000 Waste by Packaging Configuration Group (p. B-10 in the PMR) is an analogous table for debris wastes. EEG recommends that Table B1-9 should be included in

the statement quoted above–and with the Permittees concurrence, the reference to Table B1-10 may be able to be dropped.

Response: Agree with comment; Table B1-9 should be the correct reference in Attachment B1, Section B1-1a(1). It is suggested that the referenced text in Attachment B1, Section B1-1a(1), Summary Category S5000 Requirements, be revised to refer to Table B1-9 instead of Table B1-10 (remove language that indicates B1-10 and replace with B1-9) .

However, the similar text in Attachment B1, Section B1-1a(2), Summary Category S3000/S4000 Requirements, is included in order to ensure that this requirement is imposed should the compaction of S3000/S4000 waste be contemplated as a future possibility.

Comment 22: Attachment C of the PMR, Determination of Drum Age Criteria Values for Ten-Drum Overpacks, 85-Gallon Drums, and 100-Gallon Drums, which is the documentation of the computer modeling effort used to establish the new DAC, states (p. 2)

Compacted 55-gallon drums containing rigid drum liners placed inside the 100-gallon drum must meet the appropriate 55-gallon

drum DAC value established by the Permit **prior to compaction**. [emphasis added].

It was recognized by the Permittees that rigid drum liners in compacted 55-gallon drums would affect the transport of VOCs inside the 100-gallon drum, and it was prudent to allow time for the VOC/liner interactions to come into near equilibrium. However, DAC modeling is based on hypothetical drum systems that are closed except for filter vents. Crushing a drum that has been closed for some DAC period destroys the equilibrium (or near equilibrium) and essentially violates the closed system and basis for the DAC model. Any VOC absorbed by the rigid drum liner in a 55-gallon drum could de-absorb when it is crushed. Therefore, allowing a 55-gallon drum to remain closed for a DAC period prior to crushing is unnecessary since the closed-system equilibrium necessary for headspace gas testing may be nonexistent. On the other hand, placing crushed drums inside a 100-gallon drum, closing it to establish a known geometry and a known filter vent rate, then sampling its headspace after an appropriate DAC would not violate the premise of the original DAC model. That is, instead of waiting for a DAC then crushing the 55-gallon drum, the drum should be crushed, placed in the 100-gallon drum, then wait for the DAC because the system is closed. NMED should ask the Permittees to recalculate the DAC based strictly on closed system (except for filter vents) dynamics.

Response: High DAC values are specified for 55-gallon drums with rigid liners due to the slow absorption of VOCs in the liner material. A rigid liner that is not absorbing VOCs (i.e., saturated rigid liner) is minimally equivalent to having no rigid liner present. The requirement for 55-gallon drums with rigid liners to meet the higher 55-gallon drum DAC values prior to compaction is conservative compared to the case where the crushed 55-gallon drums may include desorbing liner material. The presence of desorbing liner material would result in the 90% steady-state concentration being achieved more quickly than is represented by the proposed 100-gallon drum DAC values. These DAC values are based on closed system (except filter vents) dynamics similar to the DAC values determined for 55-gallon drums and SWBs.

Comment 23: For the proposed Packaging Group 5 in Table B1-8, the line-out of the term "SWB" implies that there may be liner bags for TDOPs, as well as SWBs. However, Attachment C states that an assumption used to create the TDOP DAC is that, "The TDOP packaging configurations consist of (1) up to one SWB liner bag and (2) up to six bag layers total, up to one of which may be an SWB liner bag." There is no mention of a separate TDOP liner bag. Attachment C to this Item 1 also describes what appears to be the liner bag of a TDOP as an "SWB bag" (see p. 1).

If SWB liner bags can be used as TDOP liner bags, then the elimination of the "SWB" term in Group 5 of Table B1-8 need not be performed–and the ability to

use SWB liner bags as TDOP liner bags should be made explicit. EEG recommends that the line-through of "SWB" for Packaging Configuration Group 5 in the second and third column of the Table be rejected. Moreover, the term "SWB liner bag" no longer seems to accurately describe the use of these bags; perhaps the term should be replaced by a more appropriate term, such as "large container liner bag".

Response: Agree with comment; the liner bags and inner bags used in a TDOP are the same as those used in an SWB.

As suggested by the comment, the references to "SWB liner bag" in the descriptions of Packaging Configuration Groups 5 and 6 in the second and third columns of Table B1-8 should be retained without the changes proposed in the PMR (i.e., remove the strikeout of "SWB").

Comment 24: The proposed addition of footnote "d" to Table B1-9, Scenario 3 Drum Age Criteria (In Days) Matrix for S5000 Waste by Packaging Configuration Group, discusses "Headspace sample taken between inner and outer drum lids". This obviously refers to "true" two- lidded drums; however, footnote "b" of Table B1-8 in the current permit refers to a "double drum lid" where the drum lid and a drum liner lid often found in 55-gallon drums are meant.

Since this Item will add "true" double drum lids to the HWFP, a clear differentiation between the two meanings should be provided. EEG believes that

the current language in footnote "b" to Table B1-8 should be altered to more clearly denote that a drum lid and the drum liner lid are specified, and not a "real" double lidded drum.

There may be other instances in the current HWFP where the 55-gallon drum and liner lids are denoted as "double lids" that should also be amended.

Response: In response to the comment, it is suggested that Footnote "b" of Table B1-8 be clarified by Footnote "d" of Tables B1-9 and B1-10. Footnote "d" should be revised to add the following text: "Packaging Configuration Group 7 DAC values apply to drums with two lids."

Comment 25.: Attachment C also states that the assumption for 100-gallon drums is (p. 2):

The modeled 100-gallon drum packaging configuration includes one filtered non-polymeric (e.g., steel) inner drum lid, no layers of confinement, and no rigid drum liner.

The current TRAMPAC (Revision 19b) does not appear to allow a steel inner drum lid. Section 2.1.5 states (p. 2.1-15):

The 100-gallon drum, with or without an optional inner lid, is authorized for transport within the TRUPACT-II. An optional, rigid, **polypropylene** inner lid may be used inside the drum when posting materials from a glovebox through a bagless transfer port. [emphasis added]

Thus, the modeling performed with a metal inner drum lid would not appear to be modeling that reflects the allowable conditions in 100-gallon drums–or if it is, then the shipment of drums would not appear to meet the specifications in the TRAMPAC. If the intent is to use a steel inner drum lid in the computer modeling in order to provide a conservative value for diffusion across the barrier that the inner lid provides, then the PMR should say so. However, the TRAMPAC-authorized polypropylene lid may also create a sink for VOCs (through similar solubility to that of polyethylene liners) that would retard the achievement of steady-state equilibrium.

For 85-gallon drums, Attachment C states (p. 2):

The packaging configuration and possible sampling locations with respect to the inner and outer drum lids for the 85-gallon drum are assumed to be the same as the 100-gallon drum.

Although there is no independent information indicating that 85-gallon drums will have a two-lid conformation, NMED may want to check the specifications to be included in the TRAMPAC modification that would be required to allow direct-loading of 85-gallon drums to see whether a second drum lid will be specified, and if so, what materials are allowed for the inner lid, so that the efficacy of the modeling for 85-gallon drums can be adequately checked.

Response: The specifications for 85- and 100-gallon drums are included in the application for Revision 20 of the TRAMPAC (under preparation for submittal to the NRC). The specifications are updated to reflect current site plans, which use "steel" as the authorized material of construction for the optional inner lids.

Comment 26: Item 1, Attachment C, Appendix A states (p. A-5):

For the 100-gallon drum in which the headspace sample is taken inside the filtered non-polymeric (e.g., steel) inner drum lid prior to placement of the outer drum lid, VDRUM models this packaging configuration with a hypothetical innermost layer that is very thin. By making the innermost layers very thin as shown in the input files, their resistance to the release of hydrogen is removed from the analysis.

Note again the use of a "non-polymeric (e.g., steel) inner drum lid" in the modeling, which is contrary to the polymeric inner drum lid specified by the TRAMPAC.

Response: Please see response to Comment 25 above.

Comment 27: This statement appears to describe modeling that hypothesizes little resistance to

the flow of gases inside the container. The NMED may want to obtain information from the Permittees that will make it clear that materials packed in the 100-gallon drums will have "very thin" (i.e., nonexistent) packaging that will not impede the flow of hydrogen or other gases to be sampled, or the NMED may want to impose such a condition in the text of the HWFP.

Response: The input file of the DAC model (VDRUM) is setup such that ultra-thin walled layers of confinement must be used to effectively describe packaging configurations with no layers of confinement (i.e., no inner or liner bags), which is consistent with the packaging configuration specified in Table B1-8 as Packaging Configuration Group 7. An 85- or 100-gallon drum may be assigned to Packaging Configuration Group 7 only if the site demonstrates that the specified packaging configuration consisting of no layers of confinement (i.e., no inner bags, no liner bags) is met. The 85- and 100-gallon drums assigned to Packaging Configuration Group 7 are not allowed to have bags of any size as confinement layers. A confinement layer is a boundary that encloses the waste. For example, punctured bags, bags open at the end, and pieces of plastic sheeting wrapped around the waste for handling are not considered as confinement layers.

Comment 28: Item 1, Attachment C, Appendix A states in part (p. A-5):

Assumptions for 100-gallon drum and 85-gallon drum headspace void volumes are based on 20% of the container volume outside of the waste packaging.

Assumptions for the void volumes between the drum lids (if two lids are used) are determined based on 100-gallon drum dimensions and by scaling the 100-gallon drum dimensions for the 85-gallon drum.

These assumptions need to be supported or the permittees should demonstrate that they are unnecessary. Void volume in 55-gallon drums is extremely variable, from about 10% to greater than 90%. There are also no constraints on where in a 100-gallon drum an inner lid can be placed, except that it must be above the top of the waste and waste packaging, thus an average void volume is uncertain.

Response: The 20% void volume estimation for 85- and 100-gallon drums is consistent with the current site plans for these containers, including AMWTF current plans for the efficient loading of 100-gallon drums (i.e., three to five compacted 55-gallon drums per 100-gallon drum). In addition, changes in the void volume in these containers have minimal impact on the calculated DAC values because the transport of VOCs is primarily limited by the resistance associated with the confinement layers, such as plastic bag(s) and/or filter vent(s). The model incorporates effective resistances for VOC transport across a plastic bag and across a filter vent that are approximately two or more orders of magnitude greater than VOC transport within a void volume.

Comment 29: Item 1, Attachment C, Appendix A also states (p. A-5):v*, the release rate of the outermost layer of confinement, is set to the diffusivity of the outer lid filter.

Because VDRUM only allows entry of one filtered layer of confinement, the filter on the inner lid can be accounted for by adjusting the parameter values for the rigid liner. The dimensions of the drum liner are adjusted so the effective release rate equals the inner lid filter vent (Given $A_d = (D^*)(x_d)/(D_{c0})$, where $D^* =$ diffusivity of the inner lid filter vent, $x_d = 1.0$, and Dc_0 = hydrogen diffusivity at standard temperature and pressure). The resulting drum liner dimensions are shown in the corresponding input files.

This appears to allow an inner lid (modeled as steel) to be accounted for in the model as a liner (normally modeled as a polymer). This seems to be going beyond the earlier statement of Appendix A that (p. A-1):

This appendix includes the input and output files for the TDOP, 85-gallon drum, and 100-gallon drum that document the calculation of DAC values using the methodology described in BWXT (2000) [1].

The methodology in BWXT (2000) did not appear to include such an *ad hoc* substitution of one parameter type with another. The NMED may want to consider whether or not this process is enough of a change that a further approval of DAC methodology is necessary.

Response: The gas diffusion characteristic (or release rate) across an opening is defined in terms of the gas diffusivity, cross-sectional area, and diffusion path length. Therefore, if an inner confinement layer has a filter vent, the DAC model (VDRUM) can represent this confinement layer as a drum liner lid with an opening provided that the cross-sectional area is selected such that the gas

diffusion characteristic across the drum liner lid opening equals the filter vent gas diffusion characteristic. This simulation of the inner lid filter vent is simply for convenience and is an accurate representation (i.e., the simulation provides the same release rate as that of the actual inner lid filter vent). This substitution is similar to the use of ultra-thin walled layers of confinement to describe no confinement layers (see response to Comment 26 above) and does not change the calculation of DAC values by VDRUM.

Comment 30. New footnote 'e' for Tables B1-9 and B1-10 states:

While a DAC value of 2 days may be determined, containers must comply with the equilibrium requirements specified in Section B1-1a (i.e., 72 hours [3 days] at 18° C or higher). Generator sites may comply with these requirements simultaneously.

Appendix C (DAC computer model input/output documentation), however, indicates that the current PMR modeling-runs used 25° C as an input parameter. The Permittees should demonstrate that the 7° C difference has no effect on the calculated DACs. Also, the three day holding period at 18° C or higher was established for 55-gallon drums and SWB (~four 55-gallon drums). The Permittees should also demonstrate that this time is adequate for TDOP (~ten 55-gallon drums) contents to reach temperature equilibrium sufficient for headspace gas testing.

Response: The DAC model (VDRUM) uses 25°C, which is the same temperature used in the determination of the DAC values approved by the Class 3 modification for 55-gallon drums and SWBs. Footnote "e" on Tables B1-9 and B1-10 was simply added to clarify that this sampling and analysis requirement also has to be met. All sampling and analysis will be performed as required by the HWFP regardless of the container type.

LANL Sealed Source Waste Stream Headspace Gas Sampling and Analysis Requirements

Comment 31: This is a such a significant change in the existing procedures for waste characterization that it should be considered in a Class 3 modification process.

Response: This PMR is very similar to the two previous Class 2 PMRs which modified headspace gas sampling and analysis requirements (Headspace Gas Sampling Requirements for Homogenous Solid and Soil/Gravel Waste Streams with No VOC-Related Hazardous Waste Codes dated March 30, 2000 and approved by NMED on August 8, 2000 and Headspace Gas Sampling Requirements for Waste Streams Generated Using a Thermal Process dated March 30, 2000 and approved by NMED on August 8, 2000). Both were approved as Class 2 requests.

Comment 32: The proposal seeks to substitute headspace gas volatile organic compound (VOC) values based on packaging material for measured values determined by sampling in the case of sealed sources that do not contain VOCs in the source material. The basis for doing so is the existence of acceptable knowledge showing that no VOCs are contained in the source material. Thus, the ground for the modification must be the adequacy of such acceptable knowledge.

Response: The sealed sources are verified at the time of packaging to contain no VOCs by verifying that the sealed sources are metal canisters containing no VOC bearing material.

Comment 33: The proposal would add permit terms identifying the matters that must be documented as to each individual waste container qualifying for treatment as a sealed source. The permit would adopt the regulatory definitions in 10 CFR 30.4, 10 CFR 70.4, 49 CFR 173.403, and 49 CFR 173.469. The permit should state in additional detail how compliance with such regulations, in particular the DOT regulations, will be established.

Response: LANL has proceduralized DOT processes and the procedures have been approved by the NMED to allow the shipment of sealed sources meeting these regulatory definitions. The regulatory requirements that LANL must meet are incorporated by reference to ensure that these standards are met on any sealed sources sent to the WIPP facility.

Comment 34: The proposal calls for contamination survey results that validate the integrity of each sealed source. (B-22). The requirement should be stated quantitatively, so that it is clear how "integrity" is determined. Further, the permit should state how sealed sources that do not meet the integrity test are managed.

Response: The applicable DOT regulations define integrity in quantitative terms. That is, if a sealed source has surface contamination in excess of 0.0005 micro Curies removable radioactivity it is considered leaking and must be placed in a special form capsule to meet DOT and NRC requirements. Specification of DOT and NRC standards in the HWFP captures this requirement. It is requested that Section B-3a(1)(iii), 4th bullet be revised to read as follows "The integrity of each sealed source must be validated by documented contamination survey results to meet the requirements of 10 CFR 34.27, which must be assembled as part of the AK documentation."

Comment 35: The permit modification seems to call for visual examination (VE) at the time of packaging; i.e., it calls for verification of the use of a sealed container less than four liters in size and made of non-VOC bearing materials. It should be stated that such VE is to be performed at the generator site as part of the waste characterization process, rather than being recorded as acceptable knowledge.

Response: Because all sealed sources are already generated, they are retrievably stored waste and have significant amounts of AK associated with them. Because they are being packaged at LANL prior to disposal at WIPP, the WIPP permit requires that they

meet all of the characterization requirements of newly generated waste. This means that as they are packaged the AK is verified visually using the VE technique and no subsequent AK verification is required (i.e., subsequent radiography is not needed).

Comment 36: It is not clear how visual examination will determine that the outer casing is of non-VOC bearing material. (B-22). This should be made specific.

Response: The containers for sealed sources are metallic. As such they are not VOC bearing material.

Comment 37: The proposal states that a waste stream VOC source term for packaging is to be established based on sampling of five or more containers holding packaging materials "typical and representative" of such materials in the waste stream. (at B-4). It is not stated whether all sealed sources in the waste stream in question will be repackaged using substantially similar methods and materials, although that is the implication. This should be made explicit.

Response: All LANL OSR Program TRU sealed sources are packaged in a Pipe Overpack Component assembly payload container. Four variations currently approved and used are:

The standard 12" Pipe Component is used for sealed sources containing pure isotopes of Pu-239, Pu-238, or Am-241. These sources do not require shielding beyond that afforded by the steel in the 12" pipe.

The S-300 Container is a standard 12" Pipe Component with a polyethylene shield inside of the 12" pipe. This is used for neutron sources. Most typically Pu-239 Beryllium sources are packaged in this container and the total contents are usually limited to <10 Curies.

The S-100 Container is a 6" Pipe Component with a large Polyethylene shield surrounding the 6" Pipe and filling the space between the Pipe and the internal drum liner. This container is mainly used for the larger activity neutron sources like Am-241 Beryllium and Pu-238 Beryllium.

The S-200 Container is a Standard 12" Pipe Component which contains a lead shield for sealed sources which may emit gamma radiation and then is placed inside of cane fiberboard dunnage within the 12" pipe. Thus far this container has not been required for sealed source packaging.

These containers are described in LANL procedures and approved by NMED as part of the sealed sources program. These containers and packaging components are described in detail within Attachment D of the PMR.

Section B-3a(1)(iii) will have two changes added. These are:

Headspace gas sampling and analysis of a waste container containing a pipe overpack component belonging to the LANL sealed sources waste stream.....

- All LANL sealed sources will be characterized as newly generated waste.

Comment 38: Further, the basis for choosing a sample of five containers is not stated. Statistical support must be offered for use of five (rather than a smaller or larger number) "typical and representative" containers to derive VOC values.

Response: The selection of 5 samples to estimate the mean and standard deviation was selected because values are generally expected to be very small compared to the regulatory threshold values used in Attachment B2. These estimates are used to determine statistically the actual number of samples needed by applying the methodology in Section B2-3b of the HWFP.

Comment 39: The proposal simply calls for re-evaluation if the packaging materials are significantly changed. (B-4). It would be more appropriate if regular samples were taken to determine the existence of any change.

Response: The data in Attachment D indicates that additional sampling and analysis will yield no significantly different data. If packaging materials are changed, new source term data will be required. Currently, only two of the three pipe overpacks are being employed, the materials are specified by transportation requirements and only one source is available for these containers. However, a change in vendor or material have been specified as examples of significant change. Therefore we are suggesting that Section B-3a(1)(iii) be revised to read as follows: "The VOC sources term also must be re-evaluated if any significant (e.g., change in material

or change in manufacturer) is made to the packaging materials used in the sealed sources waste stream."

Comment 40: There should be some data to indicate that adding a sealed source to a drum does not yield and additional VOCs.

Response: The assurances for this are implicit in the basic understanding that it is physically impossible for a sealed source to be a VOC generator or a source for radiolysis if the source is sealed. There are data in Attachment D in the Section entitled "Potential VOCs from Radiolysis".

Comment 41: It is not clear why new terms for sealed sources should apply to retrievably stored waste. (B-6). It is implied in the presentation that sealed sources will be newly packaged waste.

Response: All sealed sources from LANL are retrievably stored waste that are required by the HWFP to be characterized as newly generated waste. Clarifying language in Section B-3a(1)(iii) was indicated in a previous response.

- All LANL sealed sources will be characterized as newly generated waste. The reference to LANL sealed sources in Section B-3d(2) should be removed.

Comment 42: There is an underlying question whether the sealed sources in question are defense waste, qualifying for disposal in WIPP. Some of the documentation asserts that

the materials are being assembled at LANL from "locations that are not secure." (Att. D at 1). It should be explained by Permittees how it is that defense materials containing transuranic elements are stored at insecure locations and whether all the waste in issue is actually known to be defense waste, based on acceptable knowledge or other information. Since some of the sealed sources are clearly not defense waste, it should be made clear how it is determined, and on what criteria, whether an item is defense waste.

Response: The WIPP Waste Acceptance Criteria (Section 3.1.5) requires that all waste shipped to WIPP be defense-related. The Land Withdrawal Act states WIPP may accept only radioactive waste from defense activities. Also the generator must sign a certification statement on the Waste Stream Profile Form stating that the waste is defense-related. The determination of whether the sealed sources are defense related is made well before they are packaged. Only defense related sealed sources will be packaged under this PMR for acceptance at WIPP.

Comment 43: The permit should specify the limit in dpm/wipe which determines whether a sealed source is leaking.

Response: This information is derived from 10 CFR 34.27 and is quantified in LANL procedures which are part of the approved sealed source program. A value of <0.0005 micro Curies removable radioactivity indicates the source is not leaking. The requirement in the HWFP to meet 10 CFR 34.27 incorporates this requirement.

Comment 44: What will happen if WIPP is allowed to receive greater-than-Class-C non-defense sealed sources.

Response: This PMR makes no request to receive anything other than defense related sealed sources.

Comment 45: The PMR does not indicate why the modification is needed.

Response: The first paragraph in the PMR (page 4, 1st paragraph, item 3) states the following: "The proposed modification is needed to obtain relief from characterization requirements that should not be applied to the LANL sealed sources waste streams. These changes to the headspace gas characterization requirements are requested because these are non-VOC bearing waste streams and it is therefore, unnecessary to perform this characterization technique."

Comment 46: The text in Section B-3a(1) should be revised.

Response: In order to clarify the location of the VOC sampling requirements the Permittees suggest that the text in Section B-3a(1) be changed to read " LANL waste containers that meet the conditions specified in Section B-3a(1)(iii) for sealed source containers are to be assigned VOC concentration values as directed in Section B-3a(1)(iii)."

Comment 47: Is NMED a participant in the review and approval of the LANL QAPjP?

Response: All revised QAPjPa are reviewed and approved by the CBFO and upon approval the QAPjP is sent to NMED for review. NMED also reviews and approves QAPjPs during the audit process.

Comment 48: New language in Table B-6 does not seem appropriate since it references statistical sampling.

Response: When the statistical headspace gas sampling modifications were approved the required change in Table B-6 was not included. Since a revision to this table was being made it was appropriate to include all necessary revisions to make the permit correct.

Comment 49: A list of sources would be helpful.

Response: The type of sources is part of each AK package and will be available for review during audits.

Comment 50: The modification should address reactive and hazardous constituents.

Response: The sealed source waste stream destined for disposal at WIPP is a non-mixed, non-hazardous waste stream that will not be considered reactive as indicated in the response to the NMED letter of May 8, 2003.

Removal of Formaldehyde as a Required Analytical Parameter

Comment 51: The proposal asks to delete formaldehyde on the basis of an investigation of acceptable knowledge on the issue. The investigation is documented in a two-page report (Att. G). This report states, on the main question of the presence of formaldehyde in waste generated at the Radioactive Liquid Waste Treatment Facility (RLWTF): "Operating engineers and managers of the RLWTF state that there has never been any formaldehyde processed at the RLWTF (Personal Communication—Dave Moss to Stan Kosiewicz via e-mail – TWCP-12408)." This statement is not sufficient to establish that at no time has formaldehyde been present in S3000 waste generated at the RLWTF. The showing should include a description of how records of hazardous constituents have been maintained at the RLWTF, what records would exist if formaldehyde had been present in such waste, and what examination of the records has been undertaken to determine that formaldehyde was not contained in any such waste.

Response: Formaldehyde, as a constituent of a hazardous waste, is not assigned a "D", "F", "K" or "P" hazardous waste number. However, under some circumstances formaldehyde can be a listed waste designated as U122. In order to be a "U" listed waste the waste must result from discarded commercial chemical products, manufacturing chemical intermediates, off-specification commercial chemical products and container residues (20.4.1.200 NMAC incorporating 40 CFR §261.33).

The determination as to whether a waste is a "U" listed waste is made through knowledge of the materials or the processes that generated the waste (20.4.1.300 NMAC incorporating 40 CFR §262.11(c)(2)). The United States Environmental Protection Agency (**USEPA**) has provided numerous positions, examples and interpretations as shown below to support this method of waste determination.

Hazardous waste listings are identified by the sources of the wastes rather than by the concentrations of hazardous constituents; therefore, analytical testing alone, without information on the wastes source will not produce information that will conclusively indicate whether a given waste is a listed waste. This has been EPA's longstanding policy as indicated in the 1992 EPA letter.

"*If the waste in question cannot be traced back to an original process that would generate a waste meeting any listing description, then it is exempt from regulation providing that it does not fail a hazardous waste characteristic test.*" (USEPA Letter from Sylvia Lowrance, Director OSW to Jackie Noles, December 24, 1992)

This position was further enhanced and reaffirmed in 1998 as indicated in an excerpt from the EPA memorandum shown below.

"*Where a facility owner/operator makes a good faith effort to determine if a material is a listed hazardous waste but cannot make such a determination because documentation regarding a source of contamination, contaminant, or waste is unavailable or inconclusive, EPA has stated that one may assume the source, contaminant or waste is not listed hazardous waste, and therefore, provided the material in question does not exhibit a characteristic of hazardous waste, RCRA*

Requirements do not apply." (USEPA Memorandum from Timothy Fields, Jr. and Steven Herman to RCRA Senior Policy Managers and Regional Counsels, October 14, 1998).

No records indicate that any formaldehyde entered the RLWTF, performing analyses would be of no benefit since "U" numbers can only be assigned through specific knowledge. A memo from David Moss, RLWTF Operation Team Leader to Dr. Stan Kosiewicz indicating the extent of the AK review at the RLWTF is included as Attachment B to these comments. This revised memo describes records maintained at the RLWTF and describes the examination of records undertaken to determine that formaldehyde was not contained in any TRU waste.

Comment 52: The report (Att. G) also states as to TA-55 that "formaldehyde was not used at TA-55 for any operations." Again, this statement is not sufficient to establish that at no time has formaldehyde been present in S3000 waste generated at the TA-55. The showing should include a description of how records of hazardous constituents have been maintained at TA-55, what records would exist if formaldehyde had been present in such waste, and what examination of the records has been undertaken to determine that formaldehyde was not contained in any such waste.

Response: Effluents from TA-55 that were influents to the RLWTF were caustic liquids from TA-55 chloride operations as well as caustic and acid liquids from TA-55 nitrate operations. The hazardous waste numbers for these TA-55 effluents are detailed in:

1. "Process Acceptable Knowledge Report for Chloride Operations at TA-55," Los Alamos National Laboratory Unclassfied Report, LA-UR-01-2557 (May 2001).

2. "Process Acceptable Knowledge Report for Nitrate Operations at TA-55," Los Alamos National Laboratory Unclassified Report, LA-UR-01-2555 (May 2001).

Both of these reports were based on review of documents and records related to waste generation and waste management activities at TA-55. The Acceptable Knowledge Roadmaps, Attachment 1, of both of these reports provide extensive bibliographies on material compositions, chemical lists, TA-55 procedures, LANL policy on RCRA hazardous waste numbers, safety analysis reports, as well as timelines for when hazardous waste numbers should be applied to waste outputs. These records indicate that no formaldehyde was present. A copy of the AK Report for TA-55 is included as Attachment A of these comments. It provided a description of records examined in making the determination that formaldehyde is not present as a listed waste.

The LANL FFCA 180-Day Report for TRU Waste Classification report for TA-55 from the early 1990's was also checked and no U122 wastes were reported.

Once again performing chemical analysis on these waste would prove fruitless since the "U" hazardous waste numbers must be applied through specific knowledge. The documents attached to the formaldehyde PMR, standing alone, clearly demonstrate that formaldehyde should be removed as a required analytical parameter for LANL. However, in addition to the documentation included in Attachment G of the PMR the

Permittees have attached supporting information to this submittal which includes and AK Roadmap and internal LANL Memo on the formaldehyde issue.

Comment 53: It appears that the Permittess are requesting a delisting of waste at LANL.

Response: The Permittees are not requesting a delisting of a waste. No waste has been assigned the hazardous waste number for formaldehyde (U122) therefore there is nothing to delist.. The Permittees are only asking that LANL not be required to perform unnecessary analytical testing on homogenous solid waste that has not been assigned the formaldehyde hazardous waste number.

Addition of New Hazardous Waste Numbers

Comment 54: Permittees state that the proposed modification is classified as a Class 2 permit modification, pursuant to 20.4.1.900 NMAC, incorporating 40 CFR 270.42, Appendix I, Item F.3.b. Item F.3.b describes modifications involving "storage of different wastes in containers." The current proposal involves not only storage but also disposal. Therefore, reliance exclusively upon Item F.3.b is erroneous. The application should also cite Item J.6.b, which describes landfill permit modifications involving different wastes that do not require additional or different management practices. To be sure, WIPP is a miscellaneous unit, not a landfill, but in the absence of Appendix I listings as to miscellaneous units, it is most appropriate to rely upon

a provision concerning changes in disposal practices in seeking a WIPP permit modification.

Response: The requirements for a Class 2 modification are specified in 20.4.1.900 NMAC, incorporating 40 CFR 270.42(b). These regulations only require that the permittee identify that the modification is a Class 2. It does require a reference from Appendix I of that section. The WIPP Permittees included that information only to assist NMED in their review. This is the third submittal to NMED to add new hazardous waste numbers and all have been submitted and approved as Class 2 modifications employing F.3.b (submittals in March, 2001 and approved on July 6, 2001 and a submittal in June, 2002 which was approved on November, 25, 2002). In both cases, the Permittees noted that F.3.b. was an appropriate classification, and NMED agreed with that classification.

Furthermore, permit modifications classified under Section F of Appendix I apply to changes related to the management of waste containers as specified in 20.4.1.500 NMAC incorporating 40 CFR Part 264, Subpart I. In the WIPP HWFP, this subpart applies to the storage of waste on the surface. In addition and consistent with the requirements for permitting miscellaneous units under 40 CFR Part 264, Subpart X, portions of Subpart I, (e.g., those dealing with compatibility) also apply to the management of containers in the disposal unit. Therefore, the use of F.3.b applies to the management of waste in both the storage and disposal portions of the WIPP facility.

Comment 54: The application should explain why "no adverse impact from the acceptance of hexachlorobutadiene is anticipated". Permittees should explain whether the original permit application Appendix C1 (Att. E to the proposal) considered the compatibility of hexachlorobutadiene (See Att. E at C1-2). Also should monitoring be required for hexachlorobutadiene in the underground.

Response: Page 1 of Appendix C1 of the RCRA Permit Application shows that hexachlorobutadiene was added to the compatibility study as a Group 17 constituent. The study did not find any compatibility issues since it occurs only in trace quantities. The quantities in Attachment O are related to the quantity of waste and not the concentrations of a constituent. Hexachlorobutadiene only occurs in trace quantities therefore monitoring is not necessary.

Comment 55: Were both cyanides and organics treated to below LDR standards.

Response: Page 2, 4th paragraph of the preamble to the modification should be changed to read" The treatment of organic compounds and cyanides employing UV oxidation and/or alkaline chlorination resulted in the organic compounds ~~or~~ and cyanides being treated sufficiently.....".

Comment 56: Does the 344 metric tons of the waste expected to be shipped annually include each of the proposed new hazardous waste numbers?

Response: It is currently unknown if all numbers will apply to all waste streams. To be conservative each new number was assigned an **estimated** annual volume of 344

cubic meters. Please note that the way this table is constructed, if a container contains three hazardous waste numbers it would be counted as three containers

Construction and Use of Hazardous Waste Disposal Units

Comment 57: The proposal contains attachments (Att. C through E), which set forth planned shipping, mining and emplacement schedules for WIPP. The proposal states that these schedules are not to be made a part of the permit. (A-9, A-14, A-15). Such materials must be part of the administrative record of the permit proceeding, so that they may be referred to in the future in event of changes in such schedules.

Response: These documents were submitted with the PMR and therefore they are part of the administrative record for this modification.

Comment 58: A proposal to construct underground disposal units requires a showing that the units can be constructed with structural integrity within the time period requested. Moreover, it requires a showing that the disposal units can stand ready for use, even if the shipping schedule is to some extent delayed. Such showings are related to the determinations required to be made under section 264.601. These showings are not contained in the materials presented.

Response: The current WIPP permit already addresses this concern in a comprehensive fashion. First, Module IV and Attachment M2 of the permit sets forth an elaborate and detailed program for geomechanical monitoring of each room in

each panel (see sections IV.F.1 and M2-5b(2). Secondly, the permit provides for reporting of any adverse conditions to the Secretary of NMED. Section IV.F.1.c of the Permit says: "Notification of adverse conditions - when evaluation of the geomechanical monitoring system data identifies a trend toward unstable conditions which requires a decision whether to terminate waste disposal activities in any Underground HWDU, the Permittees shall provide the Secretary with the same report...within five (5) working days...".

The geomechanical monitoring program was examined in depth during the RCRA permit proceedings for WIPP, and NMED's Administrative Hearing Officer's Findings of Fact concluded:

"143. Applicants' geomechanical monitoring program measures and assesses ground conditions in the underground to ensure safe operating conditions and to evaluate and project underground conditions and behavior...144. The geomechanical monitoring program will provide warning of instability and impending roof fall..."

In researching this issue in more detail, the Permittees have decided to propose a minor change to the language of Permit Attachment M2, Section M2-5b(2)(a) to make it explicitly clear that the geomechanical monitoring program applies to all panels. The proposed change is as follows:

"The minimum instrumentation for ~~Panels 2 through 3~~ each of the eight panels will be one borehole extensometer installed in the roof at the center of each disposal room. The roof extensometer will monitor the dilation of the immediate salt roof beam and possible bed separations along clay seams. Additional instrumentation will be installed as conditions warrant."

In summary, WIPP has demonstrated the ability to safely mine and maintain panels to the geomechanical specifications and requirements of the Permit.

Comment 59: The rate at which HWDUs are filled depends in part on the extent to which remote handled (RH) waste is emplaced in those units. No approval has yet been given for the disposal of RH waste at WIPP. There must be a showing of the possible impact upon the construction and use of HWDUs of a delay in authorization to dispose of RH waste. For example, if the pending RH modification proposal is delayed or denied, what will be the impact upon Permittees' schedule for construction and use of various HWDUs?

Response: This comment correctly points out that NMED approval of the RH PMR may be delayed. Nonetheless, the Permittees, using forethought and prudence, must plan for future activities. Therefore, based on the best information available, the Permitees have estimated that RH waste receipts will begin in 2005. The PMR

recognizes that there is some uncertainty in the BSS and MWES by noting in the closing paragraph:

"The schedules and forecasts described in this PMR are the best estimates that the Permittees have of future shipments of TRU waste to the WIPP. While it is possible that these schedules and forecasts could change as time passes, the Permittees nonetheless believe these estimates are conservative. NMED approval of this PMR will allow the WIPP to support the important goal of reducing risks associated with surface-stored TRU waste."

Comment 60: Permittees should also demonstrate how possible changes in the types of waste containers (e.g., TRUPACT-III) authorized for shipment or disposal may affect the schedule for use of HWDUs. Further, if requests to allow various waste containers are delayed or denied, what would be the effect?

Response: The mining and waste emplacement schedule, which is based in part on the PMP, contemplates that waste would be received in new container types, such as the TRUPACT-III. However, to simplify estimation of the mining and emplacement schedule, it is assumed that all waste is received in 7-packs of 55-gallon drums. Experience has shown that this simplifying assumption works well. For example, currently WIPP occasionally receives waste in TDOPs or SWBs, however for planning mining and waste emplacement schedules, WIPP mine engineers make a

simplifying assumption that all waste is received in the form of 7-packs of 55-gallon drums. These assumptions used in scheduling mining of panels and waste emplacement are explained in Section 8 of the PMR.

This comment correctly points out that NMED approval of new containers could be delayed. Any delay of approval of new containers would obviously push into the future the WIPP's ability to receive such containers. Nonetheless, the Permittees, using forethought and prudence, must plan for future activities. Therefore, based on the best information available, the Permittees have estimated that approval to receive new containers such as the TRUPACT-III will be granted in 2007 (see pg 12, Transuranic Waste Performance Management Plan, August 2002). See also response to Comment No. 59above.

Comment 61: Permittees should also state whether any response to problems concerning the nonrandom emplacement of waste might affect the schedule for shipping and emplacing waste and the usage of HWDUs.

Response: Any issues of the randomness of emplacement would relate to the long-term performance of the disposal system and would be addressed consistent with requirements applicable to the WIPP repository. Any such considerations are not expected to affect schedules for shipping and emplacing waste and the use of HWDUs.

Comment 62: Permittees should identify the principal additional factors affecting the shipping schedules contained in Attachments C through E and should explain the impact of changes in such factors. For example, should audit approval for shipments from the Idaho National Engineering and Environmental Laboratory Advanced Mixed Waste Treatment Facility be delayed, what would be the impact on the shipping schedule?

Response: Section 6 of the PMR explains what the BSS is and how it is updated. There are various logistical factors that control the BSS (e.g., number of available TRUPACTs, available trucks, availability of waste streams with approved WSPFs). All of the logistical factors that control the BSS are common to any complex transportation project. Furthermore, the BSS is shared with the public via the Western Governor's Association (each revision of the BSS is transmitted to the WGA). Furthermore, Section 7.3 of the PMR lists all major assumptions used in DOE's long term forecast, the PMP.

Comment 63: Permittees should state the extent to which attainment of the shipping rates shown on Attachments C through E depends upon approval of a permit modification authorizing a central characterization facility to operate at WIPP.

Response: The central characterization facility modification has been rescinded and was not considered in development of mining or shipping schedules.

Comment 64: Permittees should state the extent to which the attainment of the shipping rates shown on Attachments C through E depends upon authorization to ship waste to WIPP by rail.

Response: The Baseline Shipping Schedule and the mining/waste emplacement schedule are near term forecasts. Shipping by rail, a longer term initiative, is addressed in the Transuranic Waste Performance Management Plan (PMP). Any delay of approval of shipments via rail would obviously push into the future WIPP's ability to receive such shipments. Nonetheless, the Permittees, using forethought and prudence, must plan for future activities. Therefore, based on the best available information, the Permittees have estimated that approval to receive rail shipments with the TRUPACT-III will be granted in 2007 (see pg 12 of the PMP, August 2002). See also response to Comment No. 59 above.

Comment 65: Permittees should state the extent to which the attainment of the shipping rates shown on Attachments C through E depends upon authorization to use proposed characterization methods for oversized containers and/or large boxes (noted at A-11).

Response: This comment correctly points out that NMED approval of new characterization methods could be delayed. Any delay of approval of new characterization methods would obviously push into the future WIPP's ability to receive such containers. Nonetheless, the Permittees, using forethought and prudence, must plan for future activities. Therefore, based on the best available information, the

Permittees have estimated that such approval will be granted by NMED in the foreseeable future. See also response to Comment No. 59 above.

Comment 66: NMED is well aware, from the experience with Panel 1, that to construct HWDUs in advance of use and to allow such units to remain open and unused for an extended period creates the risk of deterioration of the disposal rooms and ultimately may render them partially or wholly unusable. (See A-8 at note 21). The proposed modification should contain safeguards to avoid such result. Therefore, NMED should require that Permittees advise NMED of any significant changes in shipping rates of CH or RH waste that may affect the rate of use of HWDUs. Further, Permittees should be required to delay construction of HWDUs if shipments are projected to be materially delayed in comparison to the rate shown in Attachments C through E.

Response: The Permittees propose adding language to Module IV, Section IV.F.1.b., that requires the annual reporting of mining progress to provide the NMED with necessary information regarding the future use of panels. The proposed language would read as indicated below:

"Reporting requirements - the Permittees shall submit to the Secretary an annual report, beginning twelve (12) months after issuance of this Permit, evaluating the geomechanical monitoring program and shall include geomechanical data collected from each Underground HWDU during the previous year, as specified in Permit Attachment M2, Section M2-5b(2), "Geomechanical Monitoring" and shall

include a map showing the current status of HWDU mining." See also response to Comment No. 58 above.

Comment 67: The table showing anticipated closure dates (Table I-1, at A-20) and associated text should state that Permittees shall advise NMED in the event that projected closure times differ materially from those shown in Table I-1 and that a further permit modification shall be requested to delay excavation of any HWDUs that would otherwise remain excavated but unused for a significant time, such as one year.

Response: Table I-1 of the Permit simply sets forth the earliest anticipated closure dates of the panels. The regulation at 40 CFR 264.113 sets limits on the time allowed for closure of the HWDUs after the last receipt of waste. Therefore, it is not necessary to add language to the Permit. See also response to Comment No. 57 above.

ATTACHMENT A

ACCEPTABLE KNOWLEDGE REPORTS

TA-55 PLUTONIUM FACILITY
ACCEPTABLE KNOWLEDGE REPORT

REPORT TITLE: Process Acceptable Knowledge ~~Summary~~ Report for Chloride Operations at TA-55

REPORT NUMBER: TWCP-AK-2.1-002,R.2 (LA-UR-01-2557)

WASTE GENERATED FROM PROCESS/STATUS CODES: CL, CLRD, CLS, CS, CSE, CW, CX, CXL, LD, MB, MS, PB, PRR, PUB, and SE

EFFECTIVE DATE: 05/17/01

NEXT REVIEW DATE: 05/17/03

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SITE PROJECT QA OFFICER	DATE
Charles L. Foxx	5/7/01
FACILITY REPRESENTATIVE	DATE

ACCEPTABLE KNOWLEDGE ROADMAP

P/S Codes: CL, CLRD, CLS, CS, CSE, CW, CX, CXL, LD, MB, MS, PRR, PB, PUB, and SE

Copies of these documents are in the TWCP RMDC Center. Refer to *Records Management* (TWCP-QP-1.1-004) for information on requesting copies.

TWCP Record No.	Information Category Code*	Information	Source	Summary	Limitations
TWCP-352	B	Description of plutonium recovery processes	*Wastes from Plutonium Conversion and Scrap Recovery Operations*, LA-11069-MS, March 1988.	Document describes the Pu residues and the various treatment approaches used in recovering plutonium from scrap	Document does not give information about RCRA constituents introduced or present in the processes
TWCP-614	D	All TA-55 waste is defense related	Memo from Doug Sankey.	All TA-55 waste is defense related	None
TWCP-697	C	Waste management requirements to meet WIPP WAC requirements were formalized in 1984.	*Los Alamos TRU Waste Certification Plan for Newly Generated TRU Waste*, WCP-HSE7-CPL-01, R.2 (November 1984)	Waste management requirements to meet WIPP WAC requirements. Generator Attachments were used to describe and reference specific generator procedures	Overview document - Generator Attachments provide more detailed information.
TWCP-698	B	Gives Material Type compositions	NMT Memo, NMT-7 WM/EC-96-032 Benchmark Environmental Corp. Memo, AL-7193 BEC	Gives Material Type compositions	Does not give information on how material may fractionate in TA-55 waste processes
TWCP-700	C	*Attachment 3 to the Los Alamos TRU Waste Certification Plan for Newly Generated TRU Waste*, R05	*NMT-7 Attachment, January 1995*, TRUWM-TA55-CPA-03,R00	Documents controls to meet WIPP WAC were implemented and how independent verification was accomplished	Information is not extremely detailed
TWCP-701	C	*TA-55 Generator Attachment to the TRU Waste Certification Plan for Newly Generated TRU Waste*	*TA-55 Attachment, 1987*, TRU-MST12-CPA-03,R00	Documents controls to meet WIPP WAC were implemented and how independent verification was accomplished.	Information is not extremely detailed

* Information Category Codes: A = forms intended for use in waste certification, B = data from controlled databases and published documents, C = unpublished data, and D = interviews, memos, and letters

TWCP Record No.	Information Category Code[a]	Information	Source	Summary	Limitations
TWCP-816	D	Jim Foxx Interview on Number of Layers of Packaging	C.L. Foxx, Los Alamos National Laboratory	Waste was co-mingled with room trash, and was initially boxed as low-level waste. Subsequently, some of these waste boxes were returned for disposal in drums as TRU waste when on-site radioassay results showed them exceeding the low-level discard limits.	None
TWCP-882 (UCNI)	D	Secondary Radionuclides and Toxic Metals in TA-55 TRU Waste	Memo from Jim Foxx	Lists additional radionuclides and metals potentially in waste, subdivided by process/status code. Covers time period from 1978 to the present	Best information available, but it is based on worker recollection because other records are not available
TWCP-886	C	Color Flow Diagram of Pu-processes at TA-55.	Diagram from Jim Foxx	Indicates that process inputs are thermally treated and that heavy metals from process inputs end up in the nitric acid evaporator bottoms.	Does not indicate solvent input to processes.
TWCP-887	D	Co-mingling of Defense and Non-Defense TRU Waste	Memo from Jim Foxx	Wastes generated from defense and non-defense activities were not segregated at TA-55 through 1997	None
TWCP-2501	B	"Backlog Waste Reassessment Baseline Book, Waste Form 34"	Rocky Flats Environmental Technology Site Report 1995	Page WF34-10 contains results of tests for corrosivity	Tests were conducted on residues rather than on waste.
CI-6/TWCP-3547 (UCNI)	C	Developmental Chloride Solvent Extraction Process	Procedure 462-REC, all revisions	Describes development of chloride line processes	Limited information on wastes
CI-7/TWCP-3547 (UCNI)	C	Recovery and Purification of Pu from Direct Oxide Reduction (DOR) Salts by Chloride Anion Exchange	Procedure 463-REC, all revisions	Process descriptions	Describes only one portion of chloride line; does not address use of RCRA-regulated solvents

[a] Information Category Codes A = forms intended for use in waste certification, B = data from controlled databases and published documents, C = unpublished data, and D = interviews, memos, and letters

TWCP Record No.	Information Category Code*	Information	Source	Summary	Limitations
CI-8/TWCP-3547 (UCNI)	C	Hydroxide Precipitation of Chloride Solutions Containing Organic Chemicals	Procedure 467-REC, all revisions	Process descriptions	Describes only one portion of chloride line, does not address use of RCRA-regulated solvents
CI-9/TWCP-3547 (UCNI)	C	Dissolution and/or Leaching of Various Materials in HCl	Procedure 470-CLO, all revisions	Process description	Describes only one portion of chloride line
CI-10/TWCP-3547 (UCNI)	C	Oxalate Precipitation of Plutonium from Chloride Solutions	Procedure 471-CLO, all revisions	Process description	Describes only one portion of chloride line
CI-11/TWCP-3547 (UCNI)	C	Chloride Solvent Extraction	Procedure 472-CLO	Process description	Describes only one portion of chloride line; does not address use of RCRA-regulated solvents
CI-12/TWCP-3547 (UCNI)	C	Purification and Recovery of Plutonium by Chloride Anion Exchange	Procedure 473-CLO, all revisions	Process description	Describes only one portion of chloride line
CI-13/TWCP-3547 (UCNI)	C	Hydroxide Precipitation of Chloride Waste Streams	Procedure 474-CLO, all revisions	Process description	Describes only one portion of chloride line
CI-14/TWCP-3547 (UCNI)	C	Recovery of Plutonium from Plutonium-Beryllium Neutron Sources	Procedure 476-CLO, all revisions	Process description	Detail only in decladding operation
CI-15/TWCP-3547 (UCNI)	C	Calcination Operation for Aqueous Chloride Processes	Procedure 477-CLO, all revisions	Process description	Describes only one portion of chloride line
CI-16/TWCP-3547 (UCNI)	C	Dicesium Hexachloro Plutonate	Procedure 478-CLO, all revisions	Process description	Additional step of DCHP precipitation used for certain feed material only
CI-17/TWCP-3547 (UCNI)	C	Head End Processing of Aqueous Chloride Plutonium	Procedure 479-CLO, all revisions	Process description	Does not describe where silver nitrate and potassium dichromate are disposed of

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TWCP Record No.	Information Category Code*	Information	Source	Summary	Limitations
Cl-18/TWCP-3547 (UCNI)	C	Hydroxide Precipitation of the Plutonium in Chloride Waste	Procedure 481-REC, all revisions	Process description	Describes only one portion of chloride line
Cl-19/TWCP-3547 (UCNI)	C	Recovery of Plutonium from Hydrochloric CLS-1 Solutions	Procedure 482-REC, all revisions	Process description	Does not address RCRA-regulated solvents
Cl-20/TWCP-3547 (UCNI)	C	Decladding of PuBe Neutron Sources	Procedure 482-CLO, all revisions	Process description	Decladding only
Cl-21/TWCP-3547 (UCNI)	C	Purification and Recovery of Pu by Chloride Anion Exchange	Procedure 483-CLO, all revisions	Process description	Describes only one portion of chloride line
Cl-22/TWCP-3547 (UCNI)	C	Radiochemical Analysis at TA-55	Procedure 029-CST-1, R02	Process description	Feed material only; does not address further processing
Cl-23/TWCP-3547 (UCNI)	D	Answers to questions about chloride processes	Interview with Jim Foxx 8/31/99	Answers to questions on Chloride processes	None
Cl-24/TWCP-3547 (UCNI)	D	Answers to questions about chloride processes	Interview with Jim Foxx, 9/15/99	Answers to questions on Chloride processes. Chloride operations line shut down from 1992 to 1994.	None
Cl-25/TWCP-3547 (UCNI)	D	Answers to questions about chloride processes	Interview with Jim Foxx, 9/23/99	Answers to questions on Chloride processes; CLS-1 solvent list	None
Cl-26/TWCP-3547 (UCNI)	D	Answers to questions about chloride processes	Interview with Tim Hayes, 1/12/00	Answers to questions on Chloride processes	None
Cl-27/TWCP-3547 (UCNI)	D	Answers to questions about chloride processes	Interview with Tim Hayes, 6/1/00	Answers to questions on Chloride processes	None
TWCP-3730 (UCNI)	B	Pyrophoricity characterization	Characterization of Direct Oxide Salts (LA-CP-95-0098)	Hydrogen generation and pyrophoricity of DOR salts Also gives reference for MSE, ER, and Cr-containing salts.	None
TWCP-3731	D	Sodium pyrophoricity in pyrochemical salts	Memo (MST-12-ARO-88-052)	Treatment of sodium in salts is effective	Sodium only
TWCP-3732	C	Experimental data on calcium pyrophoricity in salts	Memo (MST-12-ARO-88-077)	Treatment of calcium in salts is effective	Calcium only

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TWCP Record No.	Information Category Code*	Information	Source	Summary	Limitations
TWCP-3943	B	Procedure for Waste Management at TA-55	TA-55 Document, 406-GEN-R00	Contains information on waste management procedures in 1978	None, but doesn't address today's waste management concerns
TWCP-4162	D	Answers to questions about P/S codes PB, PuBe, CC, MB, MS, FF, BF, and other issues	Interview with Jim Foxx, 10/12/00	Answers to questions on use of asbestos at TA-55, non-defense activities, and specific P/S codes in chloride operations.	None
TWCP-4164	D	Answers to questions about various P/S codes	Interview with Jim Foxx, 10/16/00	Answers to questions on use of silver, disposal of ash and resins, and use of gases.	None
TWCP-4166	D	Answers to questions about P/S codes DO, EV, HP, CF, OR, RM, PY	Interview with Jim Foxx, 10/17/00	Answers to questions on use of chromium and silver, RCRA metals in cement, asbestos in furnaces and gloves, and disposal of spray cans used in gloveboxes.	None
TWCP-4167	D	Answers to questions about segregation of non-defense wastes; leachability of silver from ash; use of potassium dichromate in chloride operations	Interview with Jim Foxx, 10/18/00	Segregation of non-defense wastes began on 27 August 1998; analytical data show that silver in ash is below limits of regulatory concern; potassium dichromate—and not potassium chromate—was used in chloride titrations	None
TWCP-4168	D	Discussion of applicability of P-listing to beryllium in Pu-Be sources	Interview with Jim Foxx, 10/20/00	P015 is not applicable for the PuBe sources for several reasons	None

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TWCP Record No.	Information Category Code*	Information	Source	Summary	Limitations
TWCP-4720	A	Describes the procedure to be taken at TA-55 in the event of a misfire or unconsumed explosives (from the Impact Test Facility 40-mm gun, P/S codes ITF and ITF4) to ensure that explosives do not enter the waste stream	40-mm Powder Breech Project Waste Management Plan, Rev. 2 (issued March 27, 2000)	Procedure to be taken at TA-55 in the event of a misfire or unconsumed explosives (from the Impact Test Facility 40-mm gun) to ensure that explosives do not enter the waste stream	Does not appear to be a controlled document. Without revision history, cannot tell when this document was first issued, and how the potential for unconsumed explosives was addressed when the Impact Test Facility (ITF) began in 1996
TWCP-5157	D	Use of Kynar lining in chloride operations	Interview with Jim Foxx (TA-55 SME) on March 17, 2001	Kynar began to be used to line gloveboxes in chloride operations in 1988, and installation was completed in 1992.	Does not explicitly list all P/S codes in which Kynar was used
TWCP-5164	D	Sources of Cs-137 and Pa-231 in TA-55 TRU waste	Interview with Jim Foxx (TA-55 SME) on April 2, 2001	Plutonium operations never handled Cs-137 or Pa-231 in any of the Pu processing areas at TA-55. However, Cs-137 is expected to be present in the wastes because it is a fission product of several Pu isotopes. Pa-231 is expected to be present (as a function of the age of the waste) because it is a decay chain daughter of Pu-239 and U-235.	None
TWCP-5165	D	Sources of Cs-137, Pa-231 and Cm-244 in TA-55 TRU waste	Interview with Jim Foxx (TA-55 SME) on April 11, 2001	Dominant source of Cs-137 expected to be due to residual contamination from original separation of Pu from production fuel.	None
TWCP-5169	D	Use of Kynar lining in chloride operations	Interview with Jim Foxx (TA-55 SME) on April 18, 2001	Aqueous chloride operations began lining each of their new gloveboxes with Kynar in 1988, finishing in 1992	None

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TWCP Record No.	Information Category Code[a]	Information	Source	Summary	Limitations
TWCP-5378	B	Comparison of Portland cement and gypsum-based cements with respect to compliance with WIPP standards for leachability and other performance standards	*Waste-form development for conversion to Portland cement at Los Alamos National Laboratory (LANL) Technical Area 55 (TA-55)*, by G.W. Veazey et al., Report LA-13125, October 1996	Analyses on gypsum-based cemented wastes showed them to exceed RCRA limits for chromium	None
TWCP-AK-2.1-003,R 2	A	*Process Acceptable Knowledge Report for Metal Operations at TA-55*	Generators interview and TWCP AK references	Detailed information on each P/S code for metal operations at TA-55	None
TWCP-AK-2.1-004,R.2	A	*Process Acceptable Knowledge Report for Miscellaneous Operations at TA-55*	Generators interview and TWCP AK references	Detailed information on each P/S code for miscellaneous operations at TA-55	None
TWCP-AK-2.1-005,R 2	A	*Process Acceptable Knowledge Report for Nitrate Operations at TA-55*	Generators interview and TWCP AK references	Detailed information on each P/S code for nitrate operations at TA-55	None
TWCP-AK-2.1-006,R.2	A	*Process Acceptable Knowledge Report for Pyrochemical Operations at TA-55*	Generators interview and TWCP AK references	Detailed information on each P/S code for pyrochemical operations at TA-55	None
TWCP-AK-2.1-007,R 2	A	*Process Acceptable Knowledge Report for Special Processing Operations at TA-55*	Generators interview and TWCP AK references	Detailed information on each P/S code for special processing operations at TA-55	None
TWCP-PLAN-0.2.7-001,R.5	C	*Los Alamos National Laboratory Transuranic Waste Characterization AK Information Summary*	LANL TA-55 waste management database, LANL TA-54 TRU waste management database, and TWCP AK reference base on generator's original data	Detailed information on each waste drum and waste stream	None

[a] Information Category Codes: A = forms intended for use in waste certification, B = data from controlled databases and published documents, C = unpublished data, and D = interviews, memos, and letters

TA-55 PLUTONIUM FACILITY
ACCEPTABLE KNOWLEDGE REPORT

REPORT TITLE: Process Acceptable Knowledge Report for Nitrate Operations at TA-55

REPORT NUMBER: TWCP-AK-2.1-005,R.2 (LA-UR-01-2555)

WASTE GENERATED FROM PROCESS/STATUS CODES: AL, AO, AP, AS, AT, ATL, BAC, BF, BL, BM, BU, CC, CD, CF, CH, COD, COL, CPOD, CR, DF, DP, DS, ED, ETD, EV, FA, FC, FX, GMS, HC, HCD, HD, HGMS, HP, HRA, IA, IS, LC, LG1, LG2, LR, MAG, MAS, MB, MELL, MF, ML, MPD, NC, NL, NR, OD, OH, OY, PA, PAF, PR, PS, PT, PTS, RB, RBJ, RC, RCM, RFX, RO, RR, SC, SP, SSD, SX, TDC, UPS, US, US2, VC, VP1, VP2, VP3, VUL, ZD

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Charles L. Foxx — FACILITY REPRESENTATIVE — 5/7/01 — DATE

ACCEPTABLE KNOWLEDGE ROADMAP

Waste from P/S Codes AL, AO, AP, AS, AT, ATL, BAC, BF, BL, BM, BU, CC, CD, CF, CH, COD, COL, CPOD, CR, DF, DP, DS, ED, ETD, EV, FA, FC, FX, GMS, HC, HCD, HD, HGMS, HP, HRA, IA, IS, LC, LG1, LG2, LR, MAG, MAS, MB, MELL, MF, ML, MPD, NC, NL, NR, OD, OH, OY, PA, PAF, PR, PS, PT, PTS, RB, RBJ, RC, RCM, RFX, RO, RR, SC, SP, SSD, SX, TDC, UPS, US, US2, VC, VP1, VP2, VP3, VUL, ZD

Copies of these documents are in the TWCP RMDC Center. Refer to *Records Management* (TWCP-QP-1.1-004) for information on obtaining copies of these documents

TWCP Record No.	Information Category Code*	Information	Source	Summary	Limitations
TWCP-352	B	Description of plutonium recovery processes	Wastes from Plutonium Conversion and Scrap Recovery Operations, LA-11069, March 1988	Document describes the Pu residues and the various treatment approaches used in recovering plutonium from scrap	Document does not give information about RCRA constituents introduced or present in the processes
TWCP-614	D	All TA-55 waste is Defense related.	Memo from Doug Sankey.	All TA-55 waste is Defense related.	Budget information may not be acceptable.
TWCP-697	C	Waste was controlled to meet WIPP WAC requirements as early as 1983.	*Los Alamos TRU Waste Certification Plan for Newly Generated TRU Waste*, WCP-HSE7-CPL-01, R 2 (November 1984)	Waste was controlled to meet WIPP WAC requirements as early as 1983. Generator Attachments were used to describe and reference specific generator procedures	Overview document - Generator Attachments provide more detailed information
TWCP-698	B	Gives Material Type compositions	NMT Memo, NMT-7 WM/EC-96-032 Benchmark Environmental Corp. Memo, AL-7193 BEC	Gives Material Type compositions	Does not give information on how material may fractionate in TA-55 waste processes.
TWCP-700	C	*Attachment 3 to the Los Alamos TRU Waste Certification Plan for Newly Generated TRU Waste*, R05	*NMT-7 Attachment, January 1995*, TRUWM-TA55-CPA-03,R00	Documents controls to meet WIPP WAC were implemented and how independent verification was accomplished	Information is not extremely detailed.

* Information Category Codes: A = forms intended for use in waste certification, B = data from controlled databases and published documents, C = unpublished data, and D = interviews, memos, and letters

TWCP Record No.	Information Category Code*	Information	Source	Summary	Limitations
TWCP-701	C	*TA-55 Generator Attachment* to the *TRU Waste Certification Plan for Newly Generated TRU Waste*	*TA-55 Attachment, 1987*, TRU-MST12-CPA-03,R00	Documents controls to meet WIPP WAC were implemented and how independent verification was accomplished	Information is not extremely detailed.
TWCP-816	D	Jim Foxx Interview on Number of Layers of Packaging	C.L. Foxx, Los Alamos National Laboratory	Waste was co-mingled with room trash, and was initially boxed as low-level waste. Subsequently, some of these waste boxes were returned for disposal in drums as TRU waste when on-site radioassay results showed them exceeding the low-level DLs.	None
TWCP-882 (UCNI)	D	Secondary Radionuclides and Toxic Metals in TA-55 TRU Waste	Memo from Jim Foxx	Lists additional radionuclides and metals potentially in waste, subdivided by process status code Covers time period from 1978 to present.	Best information available, but it is based on worker recollection because other records are not available
TWCP-886	C	Color Flow Diagram of Pu-processes at TA-55.	Diagram from Jim Foxx	Indicates that process inputs are thermally treated and that heavy metals from process inputs end up in the nitric acid evaporator bottoms.	Does not indicate solvent input to processes
TWCP-887	D	Co-mingling of Defense and Non-Defense TRU Waste	Memo from Jim Foxx	Wastes generated from defense and non-defense activities were not segregated at TA-55 through 1997	None
TWCP-2501	B	"Backlog Waste Reassessment Baseline Book, Waste Form 34"	Rocky Flats Environmental Technology Site Report 1995	Page WF34-10 contains results of tests for corrosivity	Tests were conducted on residues rather than on waste.

* Information Category Codes. A = forms intended for use in waste certification, B = data from controlled databases and published documents, C = unpublished data, and D = interviews, memos, and letters

TWCP Record No.	Information Category Code*	Information	Source	Summary	Limitations
TWCP-2513	A	Example of Generator Reports for Drum 54856	TA-55 Records Management Center	Example of generator records including WPRF #07045 and WODF form showing the waste generator certification statement.	Older forms are often hard to read
Cl-25/ TWCP-3547 (UCNI)	D	Answers to questions about chloride processes	Interview with Jim Foxx, 9/23/99	Answers to questions on Chloride processes, CLS-1 solvent list	None
TWCP-3548/ N-1 (UCNI)	B	General description of the overall Nitrate recovery process.	*TA-55 Final Safety Analysis Report* (07/13/95)	Each step of the nitrate recovery process is described This includes pretreatment, dissolution, purification, oxidation, and evaporation	It provides mostly a current (as of 1995) description of the process. It alludes to past practices in places.
Nitrate Pretreatment Procedures					
TWCP-3548/ N-2 (UCNI)	C	P/S diagram; process diagram; process description (P/S GMS, MAG, MAS)	Magnetic Separation Research and Development, Magnetic Separation, 460-REC-R00 through R01, 1/30/89 through 11/2/92	Describes magnetic separation processes for lean and rich residues Lean residues <EDL are sent to cement fixation	None
TWCP-3548/ N-3 (UCNI)	C	Process description	Standard Operating Procedure for Handling Process Generated Residues at TA-55, 503-GEN-R00, 2/28/78	Procedure for residue handling, including liquid residues sent to recovery, not specified if nitrate or chloride processing	None
TWCP-3548/ N-4 (UCNI)	C	Process description	Standard Operating Procedure for the Packaging of Rags for Recovery, 504-GEN-R00, 2/25/78	Describes rinsing of nitrated rags in water Water sent to ion exchange.	None
TWCP-3548/ N-5 (UCNI)	C	Chemical list; process description (P/S IS based on description)	Incinerator, 422-REC-R00 through R04, 3/1/78 through 1/15/87	Describes incinerator process and disposition of ash.	P/S code IS assigned based on title and description

* Information Category Codes A = forms intended for use in waste certification, B = data from controlled databases and published documents, C = unpublished data, and D = interviews, memos, and letters

TWCP Record No.	Information Category Code*	Information	Source	Summary	Limitations
TWCP-3548/ N-6 (UCNI)	C	P/S Diagram, process description (P/S TDC)	Thermal Decomposition of Cellulose Items, 402-REC-R00, no date	Describes thermal decomposition of rags in an inert atmosphere and also how nitrated rags were soaked in water and the water sent to ion exchange	No date is available for this procedure
TWCP-3548/ N-7 (UCNI)	C	Process diagram; chemical list, process description (P/S PAF)	Oxidation of Pu Metal and Alloys Prior to Dissolution; Oxidation of Pu Metal and Alloys, Passivation Furnaces, 429-REC-R00 through R05, 3/1/78 through 12/12/95	Describes passivation furnace process	None
TWCP-3548/ N-8 (UCNI)	C	Process description	Procedure for Burning of (Pu, U) Carbides, Burning Plutonium and/or Uranium Carbides and Nitrides, 428-REC-R00 through R02, 3/1/78 through 12/8/86	Pu and U nitrides or carbides are burned to remove pyrophorics	None
TWCP-3548/ N-9 (UCNI)	C	P/S diagram, chemical list, process description (P/S VUL)	Vessel Handling and Unloading, 494-REC-R00, R01, R02, and R04, 11/15/91 through 3/12/93		R04 is marked as "Draft" with no approval signatures or date
TWCP-3548/ N-10 (UCNI)	C	Chemical list; process description	Procedure for Disposal of Oils Containing Recoverable Amounts of Pu in the Form of (U, Pu) Carbides, 431-REC-R00, 1/26/78; 431-REC-R01, no date	Oils are filtered for Pu recovery. Oils <EDL are absorbed on vermiculite for disposal Filtered solids are sent to dissolution.	None
TWCP-3548/ N-11 (UCNI)	C	Process description	Passivation, 431-REC-R00, 12/19/86	Passivation of Pu bearing materials to remove pyrophorics (Ca, Mg metal).	None

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TWCP Record No.	Information Category Code*	Information	Source	Summary	Limitations
TWCP-3548/ N-12 (UCNI)	C	P/S Diagram; chemical list; process description (P/S TDC)	Thermal Decomposition of Cellulose Items, 498-REC-R00 and R02, 6/2/95 and 8/15/97	Thermal decomposition of rags in inert atmosphere Off gases removed with caustic scrubber. Caustic is filtered and sent to RLWTF if <EDL	None
TWCP-3548/ N-13 (UCNI)	C	Process description	Anode Heel Burning, Burning Metal, 434-REC-R00 through R01, 2/6/87 through 1/30/89	Oxidation of the metal heel from electrorefining and preparation of oxide as feed for aqueous recovery.	None
TWCP-3548/ N-14 (UCNI)	C	P/S diagram, process description (P/S BM)	Plutonium Metal Burning, The Burning and Brushing of Plutonium Metal; 433-NMT7, R03; 433-REC-R00 through R03, 9/6/90; 5/13/94 through 8/15/97	Removal of friable plutonium oxide from metal and calcination of the metal.	None
TWCP-3548/ N-15 (UCNI)	C	Process description	Processing Lapping Oil and Simular Organics, 435-REC-R00, 3/1/78; 435-REC-R01, no date	Oils are filtered for Pu recovery Oils <EDL are absorbed on vermiculite for disposal Filtered solids are sent to dissolution	None
TWCP-3548/ N-16 (UCNI)	C	Process description	Evaluation of Pu (VI) Reduction by Nitrous Oxide, 493-REC-R00, no date	Experimental procedure to use nitrous oxide to reduce Pu (VI) to Pu (IV).	Procedure has no approval signatures or date Assume this procedure was never implemented
TWCP-3548/ N-17 (UCNI)	C	P/S diagram; chemical list; process description (P/S CR)	Crushing and Pulverizing, 435-REC-R00 through R05, 2/18/87 through 8/25/97	Crushing and pulverizing residues to approximately 20 mesh for dissolution in nitric acid	None
TWCP-3548/ N-18 (UCNI)	C	Diagram (not P/S), chemical list, process description	Polystyrene Cube Processing, 437-REC-R00 through R02, 1/19/83 through 10/22/84	Plutonium and depleted uranium is recovered from polystyrene plastic using crushing followed by distillation	None

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TWCP Record No.	Information Category Code*	Information	Source	Summary	Limitations
Nitrate Dissolution Procedures					
TWCP-3566/ N-19 (UCNI)	C	P/S diagram, chemical list, process description (P/S UPS)	Preferential Dissolution of Uranium Oxides from a Uranium-Plutonium Oxide Mixture, 445-REC-R00 through R03, 3/14/84 through 4/15/92	Calcined residues containing depleted uranium and plutonium are dissolved in nitric acid. The uranium is contained in the filtrate and wash solutions, which are discarded to cement fixation. The insoluble plutonium oxide is then recovered by ion exchange or oxalate precipitation.	None
TWCP-3566/ N-20 (UCNI)	C	P/S diagram, chemical list; process description (P/S ATL)	Advanced Testing Line for Actinide Separations (ATLAS) Unit Operations, 491-REC-R00 through R03; 12/23/91 through 8/25/97	The ATLAS unit was a design and development, pilot plant operation that encompassed all steps of the NO_3 operations.	None
TWCP-3566/ N-21 (UCNI)	C	P/S diagram; chemical list, process description (P/S CPOD)	Catalyzed Electrochemical Plutonium Oxide Dissolver (CEPOD), 490-REC-R00 through R01, 10/10/90 through 10/13/92	Electrochemical dissolution of Pu residues. Silver nitrate was used as a catalyst.	None
TWCP-3566/ N-22 (UCNI)	C	Chemical list, process description	Recovery of Contaminated Platinum, 430-REC-R00, 3/1/78	Recovery of Pu from platinum boats using nitric/hydrofluoric acid.	None
TWCP-3566/ N-23 (UCNI)	C	P/S diagram; chemical list, process description (P/S ED)	Casting Crucible Dissolution, 425-REC-R00 and R01, 1/26/78; Four-Inch Cascading Airlift Dissolvers, 425-REC-R00 through R07, 2/18/87 through 8/15/97	Casting crucible dissolution for plutonium recovery. Dissolution of Pu residues and finely divided materials using the 4" cascading dissolvers	None

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TWCP Record No.	Information Category Code*	Information	Source	Summary	Limitations
TWCP-3566/ N-24 (UCNI)	C	P/S diagram; chemical list; process description (P/S SC)	Slag and Crucible Dissolution Procedure, 424-REC-R00, 1/26/78 Dissolution of Sand, Slag, and Crucible in 6-inch Cascade Dissolvers; Six-Inch Cascade Dissolvers, 424-REC-R00 and R03 through R08, 5/18/88 through 8/26/97	Slag and crucible dissolution for plutonium recovery Later revisions addressed recovery of Pu from residues of sand, slag, and crucible using a 6" cascade dissolver system	None
TWCP-3566/ N-24A (UCNI)	C	Process description	Pneumatic Salt Crusher, 444-REC-R00, 1/29/90	Salt crusher is used to prepare feed materials for the six-inch cascading dissolver No chemicals used	None
TWCP-3566/ N-25 (UCNI)	C	P/S diagram; chemical list; process description (P/S MPD)	Multipurpose Cascade Dissolver System, 489-REC-R00 through R01, 10/04/91 through 9/27/94	Operation of multipurpose cascade dissolver system for processing impure Pu bearing feeds	None
TWCP-3566/ N-26 (UCNI)	C	Process diagram (not P/S); process description	Alkaline Leach of Chloride Contaminated Plutonium Oxides, 450-REC-R00, 08/21/89	Chloride contaminated Pu oxides are leached using 0.5 M sodium hydroxide to remove chloride contamination	None
TWCP-3566/ N-26A (UCNI)	C	Process description	Dissolution of High Salt and/or Chloride Contaminated Plutonium Dioxide, 448-REC-R00, 1/6/88	Recovery of plutonium from chlorinated oxide received from Rocky Flats.	This is a hand written, temporary? procedure It may have been a proposed procedure that was never implemented. No final version of this procedure was found
TWCP-3566/ N-27 (UCNI)	C	Process description	Distillation of Am IX Column Effluents to Reduce Acidity and Volume, 470-REC-R01, 08/27/84	Distillation of Am ion exchange column effluents to reduce acidity and volume.	None

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TWCP Record No.	Information Category Code*	Information	Source	Summary	Limitations
TWCP-3566/ N-28 (UCNI)	C	Diagram (not P/S); chemical list, process description. (P/S AL based on description)	Ash Leaching, 423-REC-R00 through R05, 1/26/78 through 9/14/90	Recovery of Pu from on-site and off-site ash by leaching with nitric acid and calcium fluoride.	P/S code of AL assigned based on title and description
TWCP-3566/ N-29 (UCNI)	C	Diagram (not P/S), chemical list, process description (P/S ML based on description)	Leaching of Contaminated Metals in Nitric Acid, 431-REC-R00 and R01, 10/18/90 through 1/27/94	Recovery of Pu from non-Pu metal pieces by leaching in hot nitric acid – calcium fluoride/hydrofluoric acid	P/S code of ML assigned based on title and description.
TWCP-3566/ N-30 (UCNI)	C	Process description	Processing of Contaminated Solids, 420-REC-R00 and R01, 01/26/78 through 07/09/84	Processing of contaminated solids for Pu recovery.	None
TWCP-3566/ N-30A (UCNI)	C	Process description	Dissolution of Materials, 440-REC-R00 through R01, 2/25/78 through 12/16/85	Dissolution of metals, alloys, casting skulls and plutonium compounds in nitric acid and hydrofluoric acid. Cr may be in the waste from metals, alloys and skulls.	None
TWCP-3566/ N-30B (UCNI)	C	Chemical list, process description.	Plutonium Metal Dissolution, 441-REC-R00 through R01, 2/25/78 through 3/2/83	Dissolution of plutonium metal and alloys in nitric acid and hydrofluoric acid.	R00 was renewed on 3/2/83 R01 has no approval signatures or date.
TWCP-3566/ N-30C (UCNI)	C	Chemical list, process description.	Dissolution of Oxide Derived from Calcination of Oxalate; Standard Operating Procedure for the Dissolution of Oxide Whose Nitrate Solutions are Destined for the Metal Prep Line; The Dissolution of Plutonium Dioxide Derived from Calcined Plutonium Oxalate, 442-REC-R00 through R02, 2/25/78 through 5/23/84	Dissolution of plutonium dioxide derived from calcined plutonium oxalate in nitric acid and hydrofluoric acid	None

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TWCP Record No.	Information Category Code*	Information	Source	Summary	Limitations
TWCP-3566/ N-30D (UCNI)	C	Chemical list, process description.	Dissolution of Oxide Derived from Passivation of Carbides, Metal or Casting Skulls, 443-REC-R00 through R01, 2/25/78 through 8/2/78	Dissolution of plutonium oxides derived from plutonium carbides, anodes, metal or casting skulls that have been passivated in a furnace The oxides are dissolved in nitric acid and hydrofluoric acid	None
TWCP-3566/ N-30E (UCNI)	C	Diagram (not P/S), chemical list, process description	Dissolving Chloride Melt Portion of Electrorefining Residues; Dissolving the Chloride Melt Portion of Salt-Stripping Residue, 444-REC-R00 through R01, 2/25/78 through 9/26/83	Chloride salts from electrorefining are dissolved in sodium hyroxide Then nitric-hydrofluoric acid is used to dissolve filtered solids Acid filtrate is sent to ion exchange. Appears to be related to hydroxide cake dissolution	None
TWCP-3566/ N-30F (UCNI)	C	Chemical list, process description.	Dissolution of Residues for Ion-Exchange Feed, Standard Operating Procedure for the Residue for Ion-Exchange Feed, 447-REC-R00 through R01, 7/13/79 through 6/30/81	Dissolution of plutonium residues from oxide dissolution in nitric acid and hydrofluoric acid	None
TWCP-3566/ N-31 (UCNI)	C	P/S diagram, chemical list, process description (P/S NC)	Pickling or Surface Leaching, 421-REC-R00 and R01, 1/26/78 through ?; Leaching of Noncombustible Materials in Nitric Acid, 421-REC-R03 through R09, 2/18/87 through 3/27/97	Recovery of Pu from surface contamination of noncombustible material by pickling or surface leaching.	Draft R09 also contains P/S code DO (Dissolution of Oxide)
TWCP-3566/ N-32 (UCNI)	C	P/S diagram; chemical list; process description (P/S HD, CD, HCD)	Dissolution of Chloride Generated Cake in Nitric Acid; Dissolution of Pu Hydroxide Cake in Nitric Acid, 442-REC-R00 through R03, 11/14/88 through 01/16/97	Dissolution of Pu hydroxide cake from chloride operations in nitric acid	None

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TWCP Record No.	Information Category Code*	Information	Source	Summary	Limitations
TWCP-3566/ N-33 (UCNI)	C	P/S diagram, chemical list; process description (P/S MELL)	Mediated Electro-Oxidation of Low-Level Organic Waste (formerly Catalyzed Electrochemical Plutonium Oxide Dissolver), 490-REC-R02, 9/26/94	Mediation electro-oxidation of low-level organic waste (MELLOW) uses cobalt nitrate or cerium nitrate as a catalyst to recover Pu from cellulose-based material	None
TWCP-3567/ N-34 (UCNI)	C	Chemical list; process description	Silica Removal from Americium Feed Solutions, 468-REC-R00 and R01, 10/06/83 through 11/29/83	Silica removal from Am feed solution	None
TWCP-3567/ N-35 (UCNI)	C	Diagram (not P/S); chemical list; process description	Residue Leaching, 426-REC-R00, 2/27/87	Removal of SiO_2 from solid residues by hydrofluorination to recover Pu	None
TWCP-3567/ N-36 (UCNI)	C	P/S diagram, chemical list; process description (P/S AT)	Incinerator Ash R&D Facility, 427-REC-R00, 8/22/88	Incinerator ash R&D facility for processing of incinerator ash from Los Alamos and Rocky Flats	None
TWCP-3567/ N-37 (UCNI)	C	P/S diagram; chemical list; process description (P/S SP)	Dissolution of Filter Residues and Glovebox Sweepings in Hot HNO3-HF; Dissolution of Filter Residues, Impure Oxide, and Glovebox Sweepings, 446-REC-R00 through R06, 2/3/89 through 3/27/97	Plutonium recovery from residues using nitric acid with a fluoride catalyst.	None
TWCP-3567/ N-37A (UCNI)	C	P/S diagram, chemical list, process description (P/S OD and SP)	Dissolution of Impure Plutonium Dioxides, Filter Residues, and Glovebox Sweepings in Hot HNO3-HF, 447-REC-R02, 12/18/86	Plutonium recovery from residues using nitric acid with a fluoride catalyst.	P/S diagrams were added via memo on 1/28/85 and 2/13/87. Appears as though P/S diagrams were not finalized.

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TWCP Record No.	Information Category Code*	Information	Source	Summary	Limitations
TWCP-3567/ N-38 (UCNI)	D	LANL policy on RCRA F-codes	Interview with Pam Rogers and Alice Ban	Solvent F-codes will apply to all waste streams generated from a processing an intermediate product once solvents are identified in that process.	None
TWCP-3567/ N-39 (UCNI)	D	RCRA codes associated with hydroxide cakes.	Interview with Jim Foxx of TA-55	RCRA codes associated with hydroxide cakes from the chloride process that are fed into the nitrate process	None
TWCP-3567/ N-40 (UCNI)	B	RCRA codes associated with hydroxide cakes from chloride operations that are fed to the nitrate operations at the dissolution step.	Acceptable Knowledge Summary for the TA-55 Chloride Operations	Description of the chloride operations and wastes generated based on review of historic operation procedures from the plutonium facility at TA-55.	None
Nitrate Ion Exchange Procedures					
TWCP-3567/ N-41 (UCNI)	C	Diagram (not P/S); chemical list; process description (P/S RCM)	Nitrate Anion Exchange for the Rich Column Material System, 472-REC-R00, 2/02/90	Nitrate anion exchange for the rich column material.	None
TWCP-3567/ N-42 (UCNI)	C	P/S diagram; chemical list, process description (P/S LR)	Nitrate Anion Exchange for the Lean Residue System, 471-REC-R00 through R02, 1/29/90 through 3/22/93	Nitrate anion exchange for the lean residue system to recover and purify Pu to weapon's grade specifications for storage as an oxide	None
TWCP-3567/ N-43 (UCNI)	C	Diagram (not P/S), chemical list, process description (P/S RR)	Nitrate Anion Exchange for the Rich Residues Ion Exchange Column, 470-REC-R00, 11/22/89	Pu eluate solution from the ion exchange process is precipitated as an oxalate. The Pu oxalate is calcined to an oxide.	None
TWCP-3567/ N-44 (UCNI)	C	Diagram (not P/S); chemical list, process description	Nitrate Anion Exchange, 461-REC-R00 through R02, 2/25/78 through 11/29/88	Nitrate anion exchange utilizing an anion exchange resin in nitric acid that retains the nitrato complex of Pu (IV) over most cationic impurities.	None

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TWCP Record No.	Information Category Code*	Information	Source	Summary	Limitations
TWCP-3567/ N-45 (UCNI)	C	P/S diagram; chemical list; process description (P/S RFX LR DS)	Nitrate Anion Exchange [for the Dissolved Solids (DS) System], 473-REC-R00 through R06, 10/17/89 through 7/24/98	Nitrate anion exchange process in general. The procedure starts out describing only the dissolved solids system and changes to a general description of nitrate anion exchange	None
TWCP-3567/ N-46 (UCNI)	C	Chemical list; process description	Procedure for Eluting Plutonium From Ion Exchange Columns, 473-REC-R00 and R01, 8/15/79 through 12/2/82	Recovery of accountable amounts of Pu by eluting the Pu from the ion exchange columns used in Am production.	None
TWCP-3567/ N-47 (UCNI)	C	P/S diagram; chemical list; process description (P/S RFX)	Nitrate Anion Exchange for the Rich-Feed Ion-Exchange System, 495-REC-R00 and R01, 4/29/92 through 12/15/93	Nitrate anion exchange for the rich-feed ion exchange system.	None
TWCP-3567/ N-48 (UCNI)	C	Process description	Alternate Procedure for Conversion of Plutonium Oxalate to Oxide; Conversion of Plutonium Oxalate to Oxide Using Heat Lamp and Hot Plate, 477-REC-R00 through R02, 2/03/81 through 5/14/87	Pu oxalate is converted to an oxide by heating with a heat lamp and hot plate.	None
TWCP-3567/ N-50 (UCNI)	C	P/S diagram; chemical list; process description (P/S OY)	Oxalate Precipitation of Nitrate Solutions, 479-REC-R00 through R03, 4/30/81 through 2/14/89	The feed for this precipitation process comes from the nitrate dissolution of relatively pure on-site and off-site oxides.	None
TWCP-3567/ N-51 (UCNI)	C	P/S diagram; chemical list; process description (P/S LR, DS, RCM, RR)	Oxalate Precipitation and Calcination of Ion-Exchange Elutes, 466-REC-R00 through R03, 2/25/78 through 6/15/89	Pu in ion exchange elutes are precipitated as an oxalate and the oxalate is calcined to an oxide. This operation feeds P/S OY.	None
TWCP-3567/ N-51A (UCNI)	C	Process description	Calcination; Hydrocalcination, 437-REC-R00 through R01, 3/5/87 through 2/13/89	Wet plutonium oxalate cake is burned in a furnace and converted to plutonium oxide.	None

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TWCP Record No.	Information Category Code[a]	Information	Source	Summary	Limitations
TWCP-3567/ N-52 (UCNI)	C	P/S diagram; chemical list, process description (P/S PR)	Peroxide Precipitation, 480-REC-R00 and R01, 1/21/87 to 2/14/89	Separation of Pu from catatonic impurities with the use of hydrogen peroxide for precipitation of the Pu	None
TWCP-3567/ N-53 (UCNI)	C	Diagram (not P/S), chemical list; process description	Peroxide Precipitation, 464-REC-R00 and R01, 2/25/78 through ?	Separates Pu from cationic impurities such as Ca, Cr, Mg, Ce, Co, Al, and Am by peroxide precipitation	None
TWCP-3567/ N-54 (UCNI)	C	Diagram (not P/S); chemical list, process description	Thorium Fluoride Precipitation, 468-REC-R00 and R01, 1/26/78 through ?	Separates thorium from Pu by forming the insoluble ThF_4 precipitate.	None
TWCP-3567/ N-55 (UCNI)	C	P/S diagram; chemical list, process description (P/S OH)	Procedure for Americium Hydroxide Precipitation and Filtration ; Filtration of Caustic-Treated Peroxide Filtrates, 469-REC-R00 through R03, 8/15/79 through 12/19/86	Am recovery from the filtrate which results from the precipitation of Pu peroxide in the FFTF Oxide Production Process Filtration of caustic-treated peroxide filtrates. These solutions are generated with the peroxide filtrate solutions and are dripped in to a caustic solution to destroy peroxide	None
TWCP-3567/ N-56 (UCNI)	C	Process description	Homogenization of Plutonium Oxide Product by Auger Mixing, 432-REC-R00, 02/14/89	Homogenization of PuO_2 by auger mixing.	None
TWCP-3567/ N-57 (UCNI)	C	P/S diagram; process description (P/S RB and RBJ)	Oxide Roasting and Blending, 433-REC-R00 through R01, 1/28/87 through 1/30/89	Assayed oxide from the vault is blended, sintered, reblended and sampled. This material is then used as feed for Pu metal production or direct oxide reduction. Pu metal may also be burned to an oxide	None

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TWCP Record No.	Information Category Code*	Information	Source	Summary	Limitations
TWCP-3567/N-57A (UCNI)	C	P/S diagram, process description (P/S RBJ)	Roasting and Blending JR., 443-REC-R00 and 443-REC-R02, 1/30/89 through 10/30/89	Pu oxide is reburned, sieved, blended, and sampled	None
TWCP-3567/N-57B (UCNI)	C	P/S diagram, process description (P/S RBJ, RB)	Roasting and Blending JR., 434-NMT7-R00, 3/6/92; 434-NMT7-R03, 3/3/93; 434-REC-R00 (Draft and Final) through 434-REC-R02, 4/15/94 through 8/15/97	Pu oxide is reburned, sieved, blended, and sampled	None
TWCP-3567/N-59 (UCNI)	C	Process description (P/S DS and RR)	Sampling Procedure for the Ion-Exchange Process – DS and RR, 417-GEN-R00 and R01, 4/17/86 through 1/23/89	Collecting samples of nitrate solutions to determine plutonium content and determine which ion exchange process should be used for recovery	None
Nitrate Evaporator Procedures					
TWCP-3568/N-61 (UCNI)	C	P/S diagram, chemical list, process description (P/S EV)	Treatment of Evaporator Bottoms, 485-REC-R00 through R02, 7/13/84 through 2/09/89	Treatment of evaporator bottoms generated from the volume reduction of feed from ion exchange columns. The reduced solution goes to cement fixation and the salts are discarded.	None
TWCP-3568/N-62 (UCNI)	C	P/S Diagram, process description (P/S EV)	Computer Operated Nitric Acid Volume Reduction & Treatment of Evaporator Bottoms, 485-REC-R00 through R03, 10/4/89 through 8/31/95	Computer operated nitric acid volume reduction and treatment of evaporator bottoms	None
TWCP-3568/N-63 (UCNI)	C	P/S diagram, process description (P/S EV)	Nitric Acid Process Evaporator, 485-REC-R04 and R05, 11/20/96 through 9/9/97	Evaporation process for reducing the volume of process-generated nitric acid/salt mixtures.	None

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TWCP Record No.	Information Category Code*	Information	Source	Summary	Limitations
TWCP-3568/ N-64 (UCNI)	C	P/S diagram, chemical list process description (P/S EV)	Process Nitric Acid Volume Reduction, 484-REC-R00 through R02, 10/5/84 through 3/15/90	Nitric acid volume reduction by processing ion exchange effluent through an evaporator.	None
TWCP-3568/ N-65 (UCNI)	C	Chemical list, process description	Volume Reduction of Nitrate Feed Solutions Using a Mini-Evaporator, 496-REC-R00, 10/23/95	Operation of the mini-evaporator to reduce the volume of nitrate feed solutions	None
TWCP-3568/ N-66 (UCNI)	B	RCRA-codes for evaporator bottoms	Development of Control Charts for the Evaporator Bottoms Newly Generated Waste Stream from TA-55, 3/19/99	Based on the development of control charts for analytical results, evaporator bottoms were determined to be hazardous for chromium, lead, and mercury.	None
Nitrate Cement Fixation Procedures					
TWCP-3568/ N-67 (UCNI)	C	Process description (P/S CF)	Auxiliary Activities for Cement Fixation, TRU-NMT2-DP11-R00 (Draft), 04/13/94	Auxiliary activities for cement fixation, such as preparing the 55-gallon drum, attaching and detaching drums from glovebox, and filing the cement hopper	None
TWCP-3568/ N-68 (UCNI)	C	Process description (P/S CF)	Calibration of the pH Electrode for Cement Fixation, TRU-NMT2-DP-06-R00, no date	Calibration and maintenance of pH electrodes used to measure the pH of waste solutions as part of the CF process	None
TWCP-3568/ N-69 (UCNI)	C	P/S Diagram; chemical list, process description (P/S CF)	Cement Fixation of Process Residues in 55-Gallon Drums, TRU-NMT2-DP-04, R00; TRU-NMT7-DP-04, R01 and R02, TRUWM-TA55-DP-04-R00 (Draft), 8/6/93 through 06/21/94	Cement fixation of liquid and particulate process residues in 55-gallon drums.	None

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TWCP Record No.	Information Category Code*	Information	Source	Summary	Limitations
TWCP-3568/ N-70 (UCNI)	C	P/S Diagram, Process, description (P/S CF)	Certification of Waste for Cement Fixation, TRU-NMT2-DP-12, R00, Certifying Waste for Cement Fixation, TRUWM-TA55-DP-12-R00; 4/20/93 through 7/10/97	Describes how TA-55 personnel ensure waste destined for CF are properly characterized, accounted for, and documented	None
TWCP-3568/ N-71 (UCNI)	C	Process description (P/S CF)	Documentation for Cement Fixation, TRU-NMT2-DP-14, R00 and R01; TRUWM-TA55-DP-14-R00; 3/04/93 through 7/10/97	Documentation for cement fixation Describes completing the paperwork and assembling the data package that is required to accompany each drum destined for WIPP.	None
TWCP-3568/ N-72 (UCNI)	C	Chemical list, process description (P/S CF)	Cement Fixation of Process Residues in One-Gallon Cans, TRU-MST12-DP-03, R00, 04/27/87	Process residue TRU waste at TA-55 immobilized for compliance with WIPP WAC.	None
TWCP-3568/ N-73 (UCNI)	C	Diagram (not P/S); chemical list, process description	Scrubber System for Cement Fixation Operations, 483-REC-R00, 01/30/89	Operation of the nitric acid scrubber system to prevent the premature replacement of HEPA filters used in cementing operations.	None
TWCP-3568/ N-74 (UCNI)	C	Chemical list, process description (P/S CF)	Organic Liquid Emulsification, TRU-NMT2-DP-13, R00; TRUWM-TA55-DP-13-R00, 8/30/93 through 9/30/94	Emulsifying waste oil and other organic liquids for cement fixation	None
General Documents Applicable to the Nitrate Process					
TWCP-3568/ N-76 (UCNI)	D	Comments on draft Nitrate Process AK Report	Interview with Tim Hayes of TA-55 Nitrate Operations, 1/4/00	Clarifications on various aspects of the Nitrate process, including P/S codes, time periods for P/S codes and specific operations, and appropriate terminology	None

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TWCP-3568/ N-77 (UCNI)	D	Additional P/S diagrams assigned to Nitrate Process	Memo from Jim Foxx of TA-55, 1/17/2000	P/S diagrams and codes assigned to Nitrate Operations by TA-55 personnel.	The diagrams are provided as "stand-alone" pieces of information There are no procedures associated with these diagrams and so chemical use, process description, and applicability to the nitrate process can not be established.
TWCP-3568/ N-79 (UCNI)	C	Clarification of information for all processes within the nitrates operations	Comments from Tim Hayes and Jim Foxx on the Acceptable Knowledge Summary for TA-55 Nitrate Operations, 2/25/00	Details provided for all processes within the nitrates operations.	None
TWCP-3568/ N-81 (UCNI)	C	Process descriptions, RCRA constituents, dates of generation, waste disposition (various P/S codes)	Nitrate Acceptable Knowledge Report forms completed by SMEs Tim Hayes and Jim Foxx	General process descriptions, RCRA constituents, dates of generation, and waste disposition for P/S codes without procedures.	Procedures do not exist for these P/S codes This information is based on SME knowledge.
TWCP-3568/ N-82 (UCNI)	D	Clarification of specific processes within the Nitrates operations	Jim Foxx, SME, response to comments received on the Acceptable Knowledge Summary for TA-55 Nitrate Operations, 2/25/00	Resolutions to the questions and issues raised by Pam Rogers during her review of the Acceptable Knowledge Summary for TA-55 Nitrate Operations, 2/25/00	Information is based on SME knowledge.
TWCP-3568/ N-83 (UCNI)	D	Clarification of policy on assigning EPA HWNs to D-listed constituents in TRU waste streams.	Pam Rogers, email to John Musgrave, "Re. A Few Issues," 4/11/00	All TRU waste streams containing RCRA D-listed hazardous constituents will be assigned the applicable D-code(s) unless analytical data or other acceptable information demonstrates that the concentration of the constituent is below the regulatory limit. The text will establish the caveat that the D-code can be revised (removed) based on obtaining additional information	This policy is contrary to the WIPP WAP; however, the policy allows revisions to D-code assignments based on additional information obtained

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TWCP Record No.	Information Category Code*	Information	Source	Summary	Limitations
TWCP-3568/ N-84 (UCNI)	D	Leaching equipment may result in chromium, cadmium, and/or lead being in the solution. Text regarding ensuring that incompatible waste is not packaged together is provided	Rosemary Glenn, email to Karen Chandler, "Re: Chromium," 6/8/00 and John Musgrave, email to Karen Chandler, "Re: Light Bulb!" 6/14/00 This email conveys information received from John Musgrave and Pam Rogers	Processes that leach equipment may have chromium, cadmium, and/or lead in the solutions from stainless steel, shielding, and other metal feed materials TA-55 runs a DOT incompatibility analysis on waste being sent to TA-54	
TWCP-3730 (UCNI)	B	Pyrophoricity characterization	Characterization of Direct Oxide Salts (LA-CP-95-0098)	Hydrogen generation and pyrophoricity of DOR salts. Also gives reference for MSE, ER, and Cr-containing salts.	None
TWCP-3731	D	Sodium pyrophoricity in pyrochemical salts	Memo (MST-12-ARO-88-052)	Treatment of sodium in salts is effective	Sodium only
TWCP-3732	C	Experimental data on calcium pyrophoricity in salts	Memo (MST-12-ARO-88-077)	Treatment of calcium in salts is effective	Calcium only
TWCP-3943	B	Procedure for Waste Management at TA-55	TA-55 Document, 406-GEN-R00	Contains information on waste management procedures in 1978	None, but doesn't address today's waste management concerns
TWCP-4100	D	Information on P/S/ code VP2	Nitrate AK report form completed by SME Jim Foxx, and corrected on 09/26/00	General process description, RCRA constituents, time line, and waste disposition	Procedures do not exist for these P/S codes This information is based on SME knowledge
TWCP-4162	D	Answers to questions about P/S codes PB, PuBe, CC, MB, MS, FF, BF, and other issues	Interview with Jim Foxx, 10/12/00	Answers to questions on use of asbestos at TA-55, non-defense activities, and specific P/S codes in chloride operations.	None
TWCP-4164	D	Answers to questions about various P/S codes	Interview with Jim Foxx, 10/16/00	Answers to questions on use of Ag, disposal of ash and resins, and use of gases	None

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TWCP Record No.	Information Category Code*	Information	Source	Summary	Limitations
TWCP-4166	D	Answers to questions about P/S codes DO, EV, HP, CF, OR, RM, PY	Interview with Jim Foxx, 10/17/00	Answers to questions on use of Cr and Ag, RCRA metals in cement, asbestos in furnaces and gloves, and disposal of spray cans used in gloveboxes.	None
TWCP-4167	D	Answers to questions about segregation of non-defense wastes; leachability of Ag from ash	Interview with Jim Foxx, 10/18/00	Segregation of non-defense wastes began on 27 August 1998; analytical data show that Ag in ash is below limits of regulatory concern	None
TWCP-4720	B	Describes the procedure to be taken at TA-55 in the event of a misfire or unconsumed explosives (from the Impact Test Facility 40-mm gun, P/S codes ITF and ITF4) to ensure that explosives do not enter the waste stream	40-mm Powder Breech Project Waste Management Plan, Rev. 2 (issued March 27, 2000)	Procedure to be taken at TA-55 in the event of a misfire or unconsumed explosives (from the Impact Test Facility 40-mm gun) to ensure that explosives do not enter the waste stream	Does not appear to be a controlled document. Without revision history, cannot tell when this document was first issued, and how the potential for unconsumed explosives was addressed when the Impact Test Facility (ITF) began in 1996
TWCP-5164	D	Sources of Cs-137 and Pa-231 in TA-55 TRU waste	Interview with Jim Foxx (TA-55 SME) on April 2, 2001	Plutonium operations never handled Cs-137 or Pa-231 in any of the Pu processing areas at TA-55. However, Cs-137 is expected to be present in the wastes because it is a fission product of several Pu isotopes. Pa-231 is expected to be present (as a function of the age of the waste) because it is a decay chain daughter of Pu-239 and U-235.	None

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TWCP Record No.	Information Category Code*	Information	Source	Summary	Limitations
TWCP-5165	D	Sources of Cs-137, Pu-231, and Cm-244 in TA-55 TRU waste	Interview with Jim Foxx (TA-55 SME) on April 11, 2001	Dominant source of Cs-137 expected to be due to residual contamination from original separation of Pu from production fuel. Cm-244 introduced in P/S code DOP starting in 1988, but could also show up after that date in IS, WE, CA and CF.	None
TWCP-5371	D	Source and processing of HRA materials	Interview with Jim Foxx (TA-55 SME) on April	HRA refers to process residues sent from Hanford Reservation to TA-55 for plutonium recovery This material was sent through nitrate operations but its waste was tracked by its source code (HRA) instead of the P/S code in which the waste was generated. To be conservative, all HWNs that are applicable to P/S codes in nitrate operations (other than the cementation processes CF and HP) are also applied to wastes from HRA These HWNs are D005, D006, D007, D008, D009, and D011.	None
TWCP-AK-2.1-002,R.2	A	*Process Acceptable Knowledge Report for Chloride Operations at TA-55*	Generators interview and TWCP AK references	Detailed information on each P/S code for chloride operations at TA-55	None
TWCP-AK-2.1-003,R.2	A	*Process Acceptable Knowledge Report for Metal Operations at TA-55*	Generators interview and TWCP AK references	Detailed information on each P/S code for metal operations at TA-55	None

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TWCP Record No.	Information Category Code*	Information	Source	Summary	Limitations
TWCP-AK-2.1-004,R 2	A	*Process Acceptable Knowledge Report for Miscellaneous Operations at TA-55*	Generators interview and TWCP AK references	Detailed information on each P/S code for miscellaneous operations at TA-55	None
TWCP-AK-2.1-006,R.2	A	*Process Acceptable Knowledge Report for Pyrochemical Operations at TA-55*	Generators interview and TWCP AK references	Detailed information on each P/S code for pyrochemical operations at TA-55	None
TWCP-AK-2.1-007,R.2	A	*Process Acceptable Knowledge Report for Special Processing Operations at TA-55*	Generators interview and TWCP AK references	Detailed information on each P/S code for special processing operations at TA-55	None
TWCP-PLAN-0.2.7-001,R.5	C	*Los Alamos National Laboratory Transuranic Waste Characterization AK Information Summary*	LANL TA-55 waste management database, LANL TA-54 TRU waste management database, and TWCP AK reference base on generator's original data	Detailed information on each waste drum and waste stream	None

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ATTACHMENT B

MEMO ON ACCEPTABLE KNOWLEDGE REVIEW AT RLWTF

To: Dr Stan Kosiewicz RRES-CE
Thru; Dennis Mclain FWO/WFM Facility Manager / Group Leader
From: Wm. David Moss FWO/WFM RLWTF Operation Team Leader acting

To whom it may concern.
I was asked by Dr. Stan Kosiewicz, LANL, if I had any knowledge of formaldehyde ever being sent in wastewater to be treated in the Radioactive Liquid Waste Treatment Facility (RLWTF)TA-50-1.
David Salazar (30 years with RLWTF) and myself (22 yrs plus, 12 years in supervision) discussed whether we knew of any generators disposing of formaldehyde in wastewaters or had smelled formaldehyde in the wastewater at RLWTF, TA-50-1, neither of us had. Additionally daily logs of the plant operations include comments of batch waste received and records of spills, and unusual events. One such event was an unplanned spill of Cr +3 from Sigma in the early 80's. Both Dave Salazar and I recall picking up carboys of formaldehyde with P-32 from the Health Research Laboratory TA-43. This waste was not treated at the TA-50-1 RLWTF. The treatment method for this waste was to pour the liquid into an active disposal shaft located at TA-21. Periodically, cement paste was introduced into the shafts to cap the waste. In 1986, Area T was declared an inactive disposal site. David Salazar remembers picking up waste from TA-43 for the Area T shafts as far back as 1973. Records of the waste from TA-43 for disposal at Area T were kept on the daily logs as batch waste.

No historical daily logs and analytical records as generated and reviewed /filed by me have to my knowledge any reports of spilled formaldehyde being discharge into the LANL's radioactive liquid waste collection system. All waste collected in the system is treated at the TA-50-1 RLWTF.
No analytical results for formaldehyde are found.
A retired Section Leader who spent his career at TA-50-1 RLWTF was consulted and replies that no quantities of formaldehyde had been treated at TA-50-1 RLWTF to his knowledge also.

TA-50 waste streams 17 and 18 are generated from TA-55 influent only. These waste streams do not carry any U-122 codes either.

Wm. David Moss
FWO/WFM RLWTF
TA-50-1
667-4301

Received by Stan Kosiewicz
on July 10, 2003.